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THE JOURNAL OF EDUCATIONAL PSYCHOLOGY

SOME NORMS OF DARTMOUTH FRESHMEN[1]

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SUMMARY

One of the more immediate problems for workers in the field of mental measurements is the accumulation of norms. Two hundred Dartmouth freshmen were measured individually and their performance in seven tests is here presented in graphic form, by means of percentile curves of distribution. The "ogive" percentile graph here used, has an advantage over the more common "surface of distribution," in that it serves as a convenient scale, and facilitates comparison of additional individual measures with these measures already made on a large group.

Progress in the science of mental tests may at the present time wisely take any one of several directions. We may make intensive studies of individual tests in order to bring the methods and procedure in these tests to a maximum of simplicity and precision, and to evaluate them in comparison with other available tests as regards relative reliability, convenience, and applicability to different purposes. We may study these tests from the theoretical side in the effort to analyze the mental functions measured, and to learn the facts about the interrelationships of these functions. Or, accepting the formulations of method already worked out, and not giving ourselves

[1] Read at the Philadelphia meeting of the American Psychological Association, December, 1914.

deep concern regarding either theoretical or practical implications of what we are doing, we may devote ourselves to the somewhat humbler but very necessary task of accumulating norms of performance and constructing scales. It is to this latter type of research that the present offering belongs.

The Tests Described.

This paper reports the results obtained in mental tests given during the year 1913–14 to two hundred members of the Dartmouth freshman class. All of the tests were given individually except the two memory tests, which were given to groups of from eight to twelve subjects. The writer had the assistance of a number of psychology students,[2] and the results are consequently representative of what can be obtained with these tests in the hands of relatively unpracticed experimenters.

The *endurance of grip* test was given by the method of continuous contraction. The procedure specified by Whipple[3] was followed, except that the subject was permitted to stand and to hold the dynamometer in a natural position by his side. The score in this test is the index of fatigue, computed according to the formula

$$x = \frac{r_1 - r_2}{r_1}$$

where r_1 is the average of the first four readings and r_2 the average of the last four. It should be noted that the standard directions to the subject do not always insure maximal effort at the start.

The *tapping* test was given in the standard manner used by Wells. The precise procedure specified in Whipple's *Manual*[4] was followed with two exceptions—the records with the right hand only were taken; and the entire tapping record, including the very first taps after the signal "Now," was recorded on the kymographic drum. The writer can see no reason for omitting to get a record of the first two or three seconds of tapping. They are sometimes the most interesting and characteristic of the

[2] He wishes to mention in particular the valuable coöperation of Messrs. R. B. Teachout and B. Ruml.

[3] G. M. Whipple. *Manual of Mental and Physical Tests.* 1914, p. 117.

[4] Op. c., pp. 130–134.

whole record; and moreover, the procedure specified by Whipple to exclude these taps puts an unnecessary tax upon the experimenter. The number of taps for each five-second period of each trial was counted, and the results are given in terms of what Wells calls the "total efficiency" score, the average number of taps in five trials of thirty seconds each.

The only test in sensory discrimination included in the series was *discrimination of lifted weights*, and this test was abandoned after one hundred records had been gathered. The rapid procedure necessitated by limitations of available time seemed to be giving measures quite too unreliable to be useful.

In the test of *memory span* for auditory digits, two successes out of three trials was counted as passing. The smallest number of digits given was six, since at the time the experiments were planned, it was not supposed that any Freshman would fail on that number. As a matter of fact, six per cent. of the class did fail on numbers of six digits; consequently we have no record of the lower limit in this ability.

The test of *logical memory* consisted in the written reproduction of the sense of a prose paragraph, immediately after hearing it read aloud. The score is in terms of the percentage of ideas reproduced. The selection was the paragraph from the Columbia freshman tests, beginning, "Tests such as we are now making are of value both for the advancement of science, and for the information of the student who is being tested."[5]

For the *cancellation* test, use was made of the Woodworth and Wells' number blank, Form A.[6] A stop-watch was used in taking the time required to cancel the digit 1 from among the 500 digits on the first half of the blank; and then as soon as this time had been recorded, the time was taken to cancel the 1's from the second half of the same blank. The score represents the average of two trials in making fifty reactions. Practically no correction for errors needed to be made, except in rare instances when an entire line was skipped. The rule was followed of adding 2 per cent. of the time for each error or omission.

The *color-naming* test was given as specified by Woodworth and Wells (p. 49), the entire blank being used at one trial, and the time being noted for the first and second halves. Given in

[5] MARY T. WHITLEY. *Tests for Individual Differences*, 1911, p. 55.
[6] R. S. WOODWORTH AND F. L. WELLS. *Association Tests*. Psychological Monographs, 13: (whole No. 57): 1911, 24.

this manner, however, the two scores cannot be taken as two measures of the same trait, for subjects do not ordinarily do as well in the second half of this test as in the first half, as the writers of the monograph themselves pointed out. The first half of the blank should be used, and then after a pause, the second half; or else the blank as a whole should be used twice, in different positions. We give here our results in terms of the time taken to complete the blank as a whole (100 reactions).

What has been said about taking the time of the first half and the second half of the color-naming test applies equally to the *directions* test. (Woodworth and Wells, p. 72.) Our results with this test will not be published because, before the entire group had been tested, enough information regarding this test had spread among the freshmen to invalidate the later results. This is one of the tests which might better be given to the entire group at once, for reasons that are not limited to those of economy of time.

Ten of the *logical relations* tests were used,[7] including easiest opposites, easiest verb-object, supra-ordinate concept, sub-ordinate concept, part-whole, whole-part, agent-action, action-agent, attribute-substance, and mixed relations. It was found most convenient to have the numerous lists of stimulus words arranged in a small scrap book, so that the turning of the pages would disclose first the sample instruction words, then the first half, and then the second half of the successive tests. The responses were spoken aloud, and the time taken for each list of ten reactions. The results here presented combine into a single measure the scores made by the student in all of these logical relations tests except the mixed relations or analogies test, which is more difficult than the others, and is therefore presented separately. The nine other logical relations tests yielded eighteen measures. A typical score for each individual was found by taking the ninth of these eighteen measures, beginning with the fastest. This is almost identical with the median.

The *perception of form* test is one for which I am indebted to Mr. Albert S. Osborn,[8] a specialist in handwriting, the detection of forgeries, etc., and the author of the volume entitled "*Questioned Documents.*" Mr. Osborn calls this the "Form Blindness Test" because he devised it for the purpose of finding

[7] Woodworth and Wells, pp. 56–64.
[8] A. S. Osborn. *Form Blindness.* Case and Comment, 19: 1913, 800–897.

whether or not a judge is capable of noticing small differences and similarities of form. The same word was written fourteen times on seven different typewriters of the same make. These fourteen samples, arranged in irregular order, were photographed and enlarged. The test measures the time required to find the seven pairs. A much longer form of the same kind of test measures an ability in noting individuality in handwriting. A sheet is shown on which is the word "York" written forty times by twenty writers, making twenty pairs. The comparison words are unmistakable when found; consequently this is a test in quickness of noticing similarities of form. Only the briefer test was used with the freshmen.[9]

Suggestibility was tested by means of progressive weights, and also by means of three standard normal illusions. The use of the latter material may be illustrated by the procedure with the size-weight illusion. The freshman was shown the two wooden blocks and given instructions in the following words: "The smaller of these two blocks is weighted with lead so that it actually weighs the same as the larger block. The two are equal in weight. But most people, when they heft first one and then the other with one hand, like this, say that the small one feels heavier than the large one. How does it feel to you?" This procedure, it will be noted, tends to select those who are negatively suggestible, those who suspect the experimenter is trying to fool them, when as a matter of fact, he is entirely frank and straightforward. Eight per cent. of the group were susceptible to this form of suggestion.

Four *ingenuity* tests with standard puzzles were used; but after about eighty freshmen had been tested, it was impossible to be sure which of the remaining freshmen came to these tests ready-primed. Consequently no report on these data will be made.

Discussion of Results

A summary of results is given in the accompanying table, which shows nine of the tests arranged in order of variability. For each test is shown the score reached or exceeded by one-

[9] The writer understands that Professor Jastrow has been for some time making use of this material at the University of Wisconsin, but no results have been published as yet.

half of the group of 200 freshmen; the standard deviation from this central tendency; the coefficient of variability within the group, or ratio of standard deviation to median; and the range from poorest to best.

NORMS FROM 200 DARTMOUTH FRESHMEN

Test	Median	σ	Coef. of Variability	Range	
				Poorest	Best
1 Tapping Average of five 30-sec. trials	211.6	24.18	0.11	151.8	278.4
2 Color Naming Total time, 100 reactions	56.2 sec.	9.02	0.16	91.6	33.2
3 Logical Relations Time for 10 reactions	12.6 sec.	2.16	0.17	20.0	8.2
4 Memory Span Auditory digits	7 digits	1.38	0.20	5 or less	12.0
5 Mixed Relations Time for 10 reactions	28.5 sec.	7.63	0.27	54.9	13.5
6 Cancellation Time for 50 reactions	48.3 sec.	15.06	0.31	144.0	31.5
7 Logical Memory Per cent. of ideas reproduced	35%	14.20	0.41	7.0	87.0
8 Endurance of Grip Index of fatigue	0.32	0.14	0.46	0.68	(—0.37)
9 Perception of Form Time for Osborn Test No. 2	4 m. 5 sec.	3 m. 3 sec.	0.62	Failed in 20 min.	55 sec.

Comparing these records with those of other groups, we are struck first of all with the relatively poor scores in memory span and logical memory. In the latter tests, the Columbia freshmen score 44.5 as over against 35.0 for this group.

In the cancellation test we find a much wider range and a lower central tendency than Woodworth and Wells found (p. 29). The same may be said for the results in the color-naming test, and the tests in logical relations. In each of these types of mental task, the freshman mind seems to work rapidly. Most interesting is the showing made in the tapping test. The median score, 211.6, is not far below the score of 220.4 given by Wells[10] as typical for a normal individual near the limit of practice.

[10] F. L. WELLS. *Normal Performance in the Tapping Test.* American Journal of Psychology, 19: 1908, 438.

Convenience of the Ogive

The data in seven of the tests have been thrown into the form of percentile curves of distribution. (Figures I–VII.) The reason for choosing Galton's "ogive" form of graphical representation is that it furnishes a convenient scale.[11] The curve at each point shows the percentage of the group doing no better than the score there indicated. Knowing the score made by any individual, one can by reference to the chart instantly assign him a rank among one hundred of his classmates. For example, having found that a certain student requires 22.6 seconds to complete the color-naming test, reference to the graph shows at a glance that this score corresponds to the rank of "thirty-third from the poorest" among a hundred freshmen.

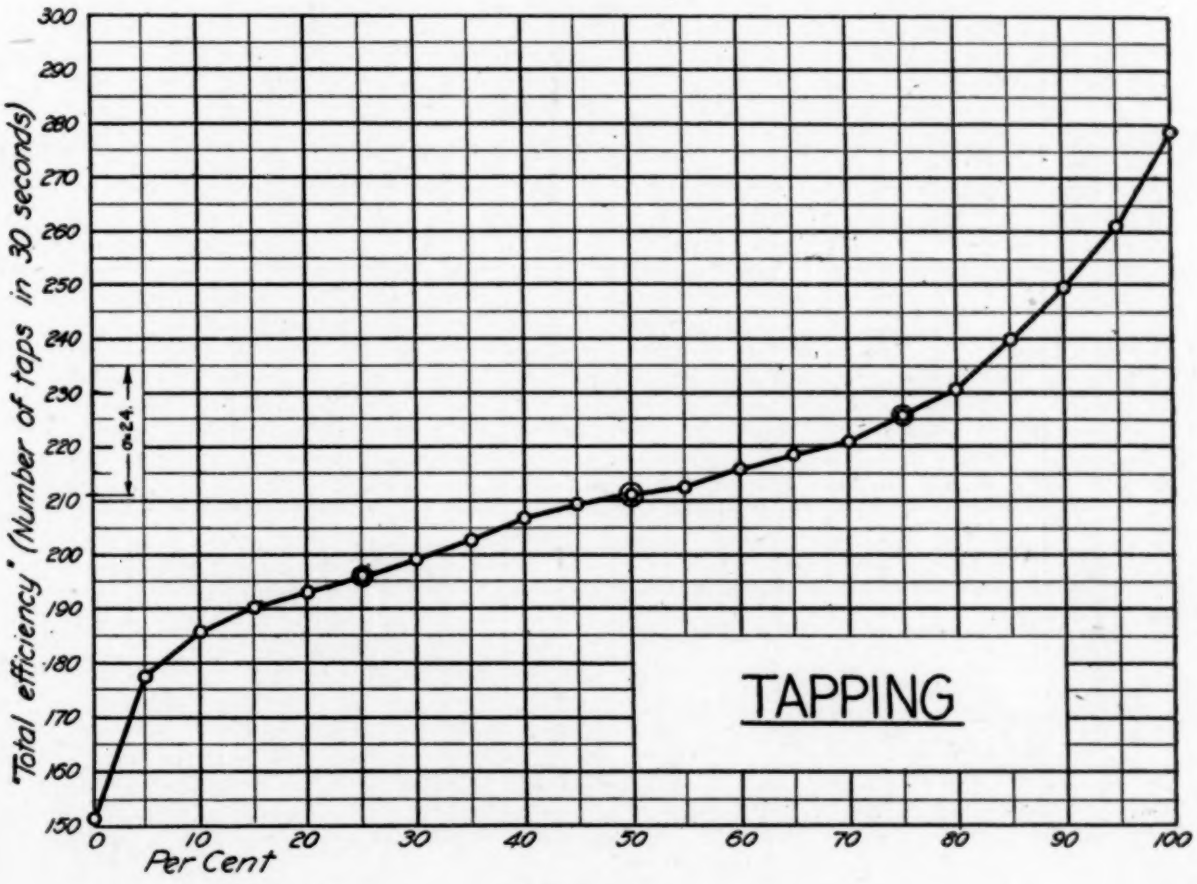

Figure I.

[11] G. U. Yule. *An Introduction to the Theory of Statistics*, 1911, p. 152.

Some readers may be interested to compare the ogive with the ordinary "surface of frequency" graph, and for this purpose the data regarding the index of fatigue in the endurance of grip test are charted in both ways. (Figures VII and VIII.)

No percentile charts are given for the memory tests because in the method of scoring used, the steps in the scale are too few to make a comparison by the method of relative position useful.

In all of the charts given, it will be noticed that the distribution is sufficiently smooth to warrant interpolation.

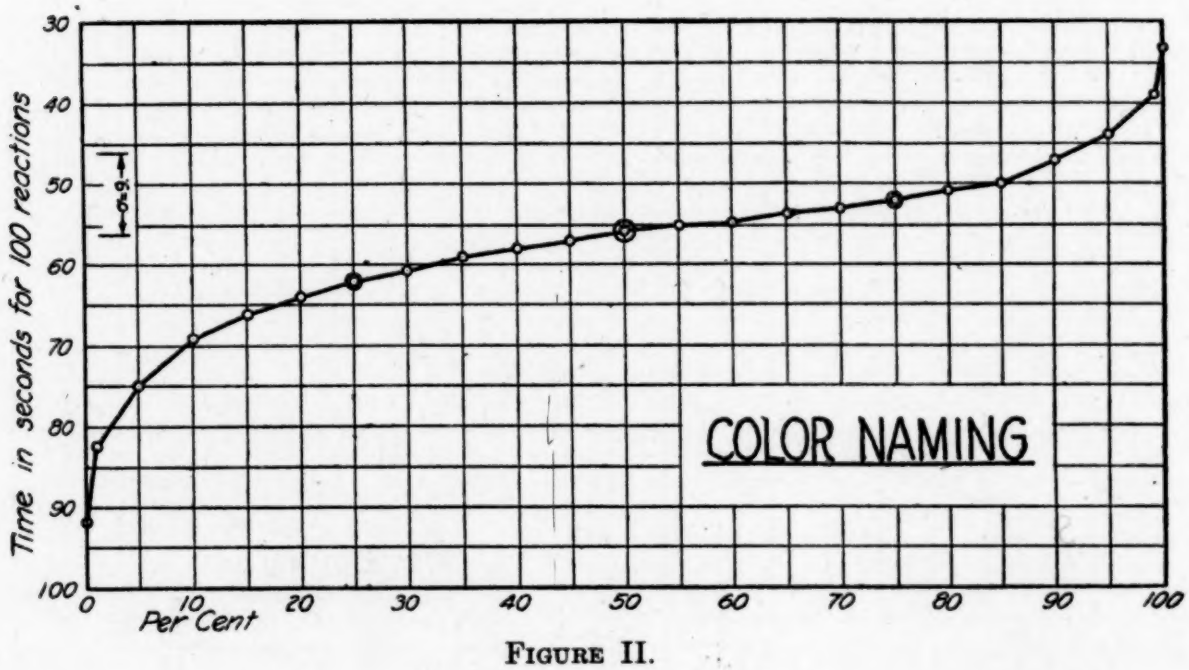

FIGURE II.

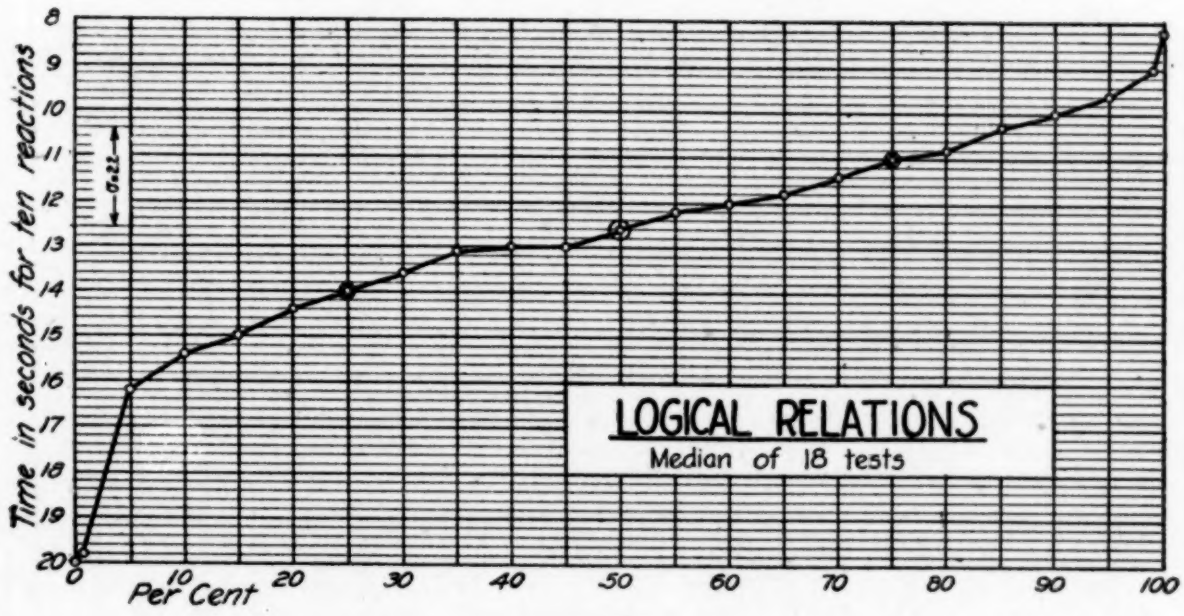
Time in seconds for ten reactions
8
9
10
11
12
13
14
15
16
17
18
19
20
0.22
LOGICAL RELATIONS
Median of 18 tests
0
10
20
30
40
50
60
70
80
90
100
Per Cent

FIGURE III.

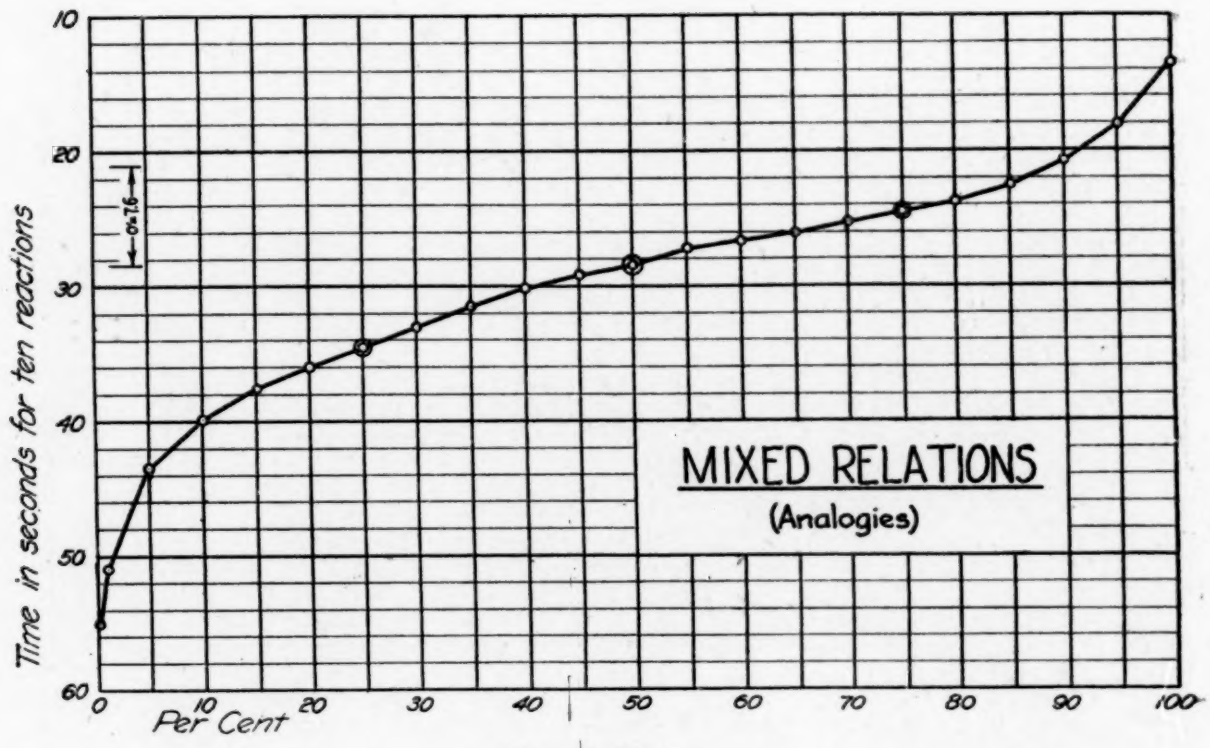
Time in seconds for ten reactions
10
20
30
40
50
60
0.16
MIXED RELATIONS
(Analogies)
0
10
Per Cent
20
30
40
50
60
70
80
90
100

FIGURE IV.

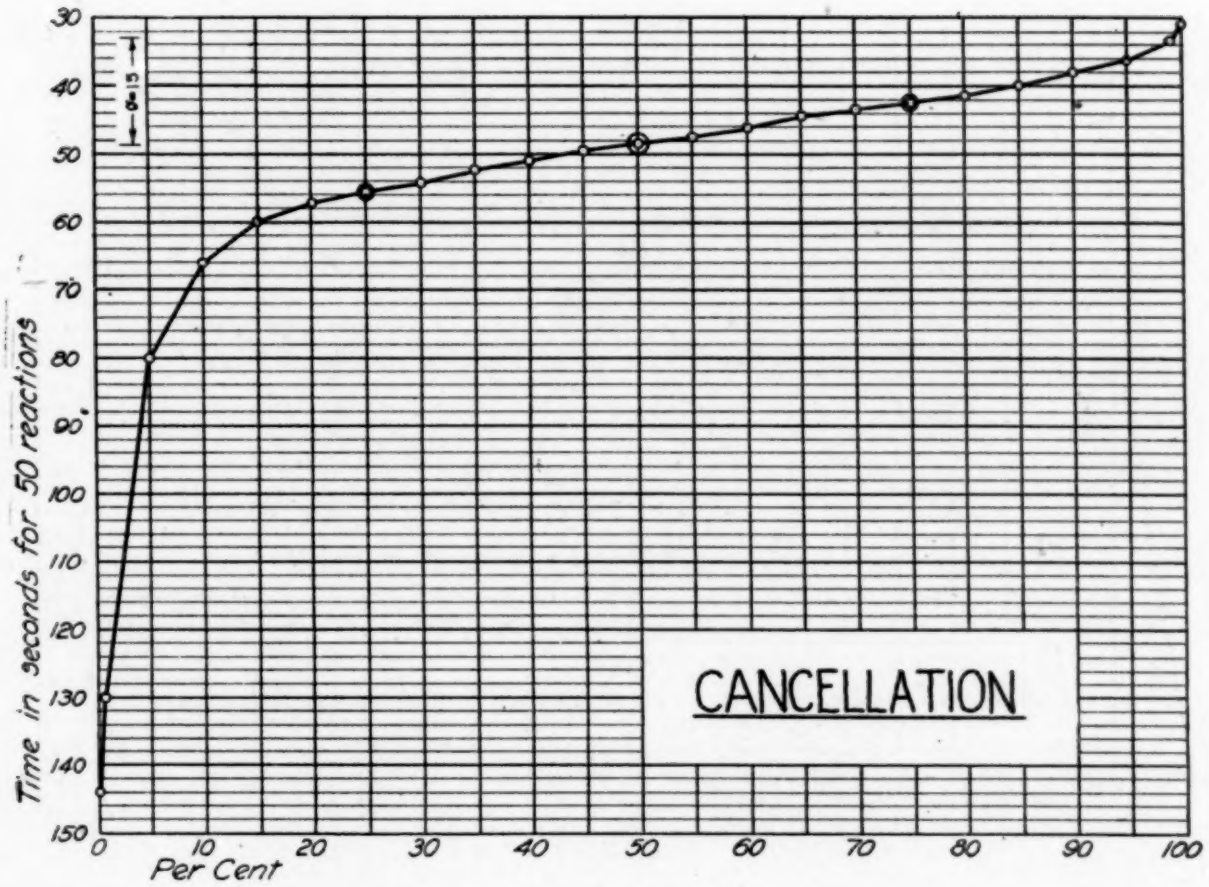
Time in seconds for 50 reactions
30
40
50
60
70
80
90
100
110
120
130
140
150
0
10
20
30
40
50
60
70
80
90
100
Per Cent
CANCELLATION

FIGURE V.

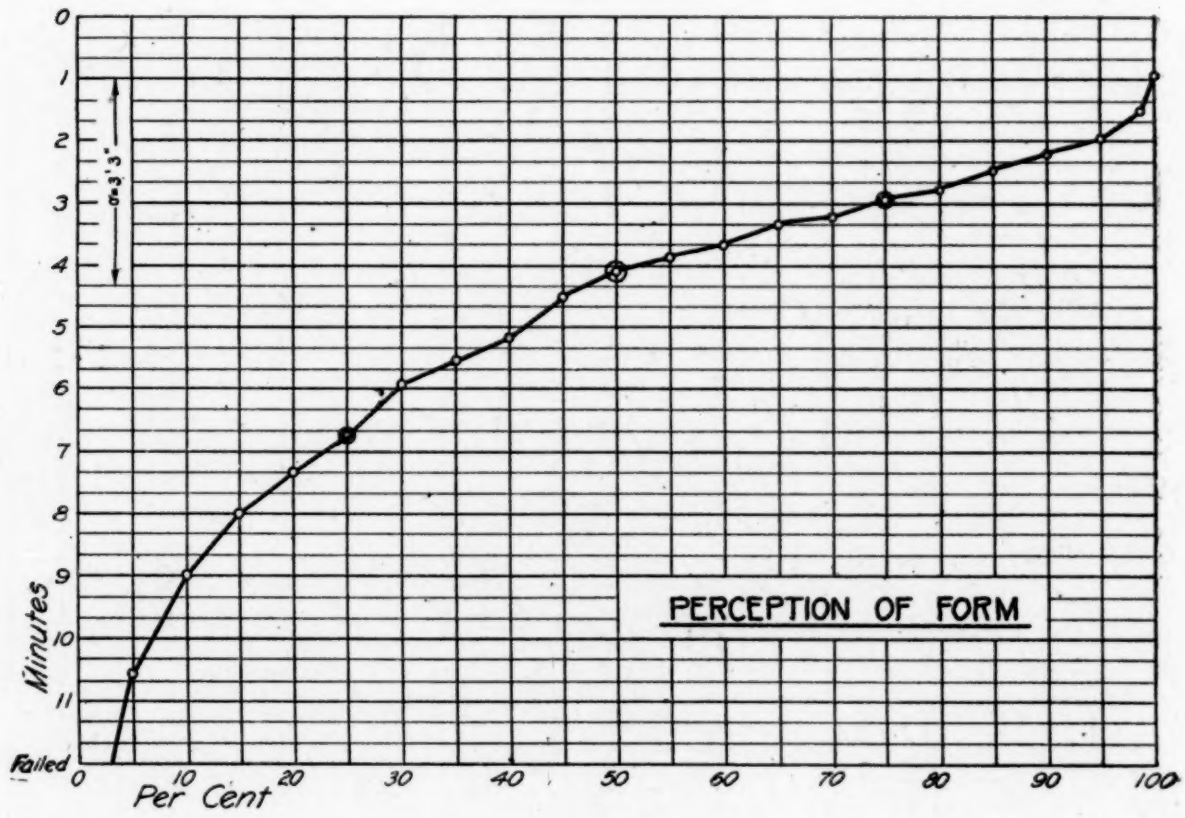
0
1
2
3
4
5
6
7
8
9
10
11
Failed
Minutes
6-3'3"
PERCEPTION OF FORM
0
10
20
30
40
50
60
70
80
90
100
Per Cent

FIGURE VI.

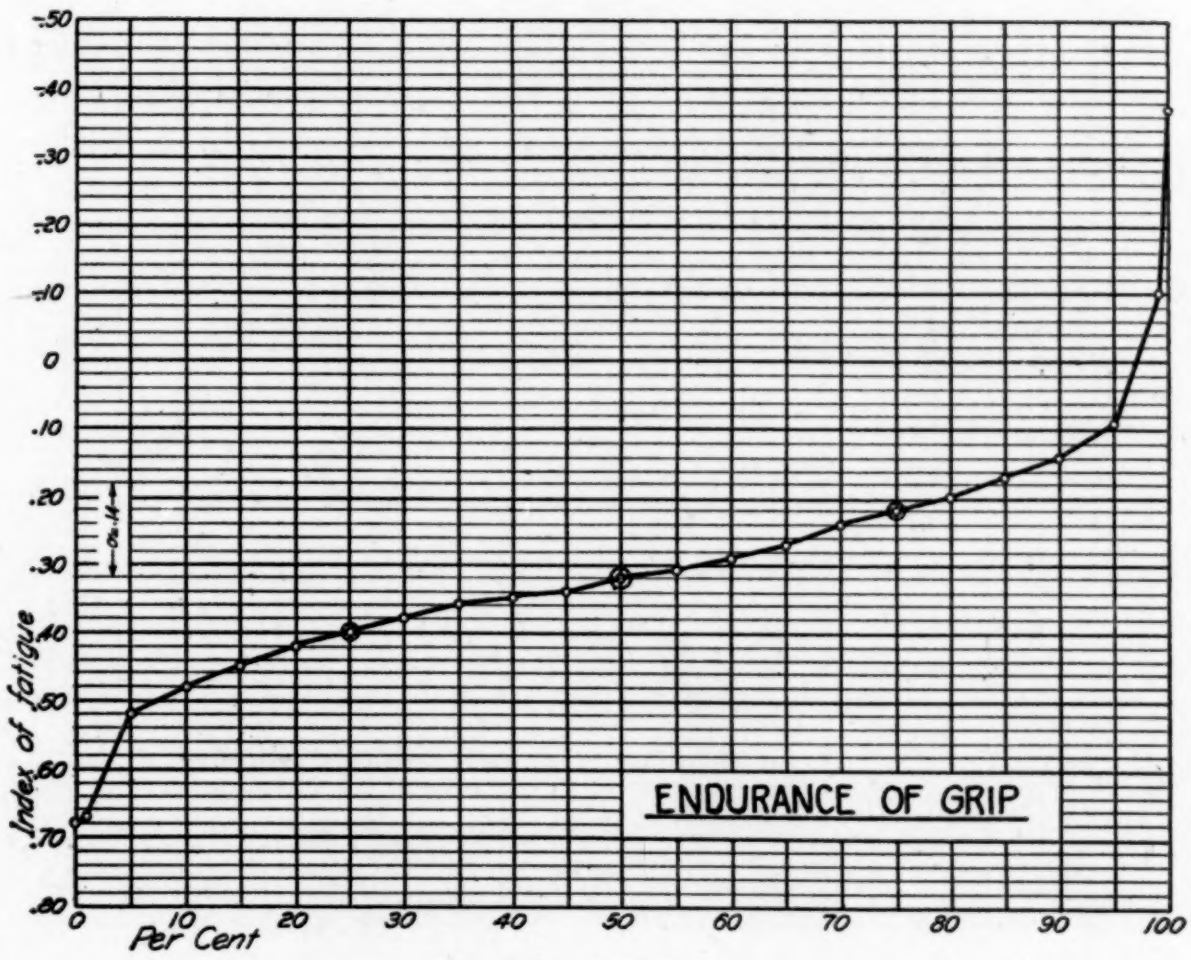
-.50
-.40
-.30
-.20
-.10
0
.10
.20
.30
.40
.50
.60
.70
.80
Index of fatigue
.14
0
10
20
30
40
50
60
70
80
90
100
Per Cent
ENDURANCE OF GRIP

FIGURE VII.

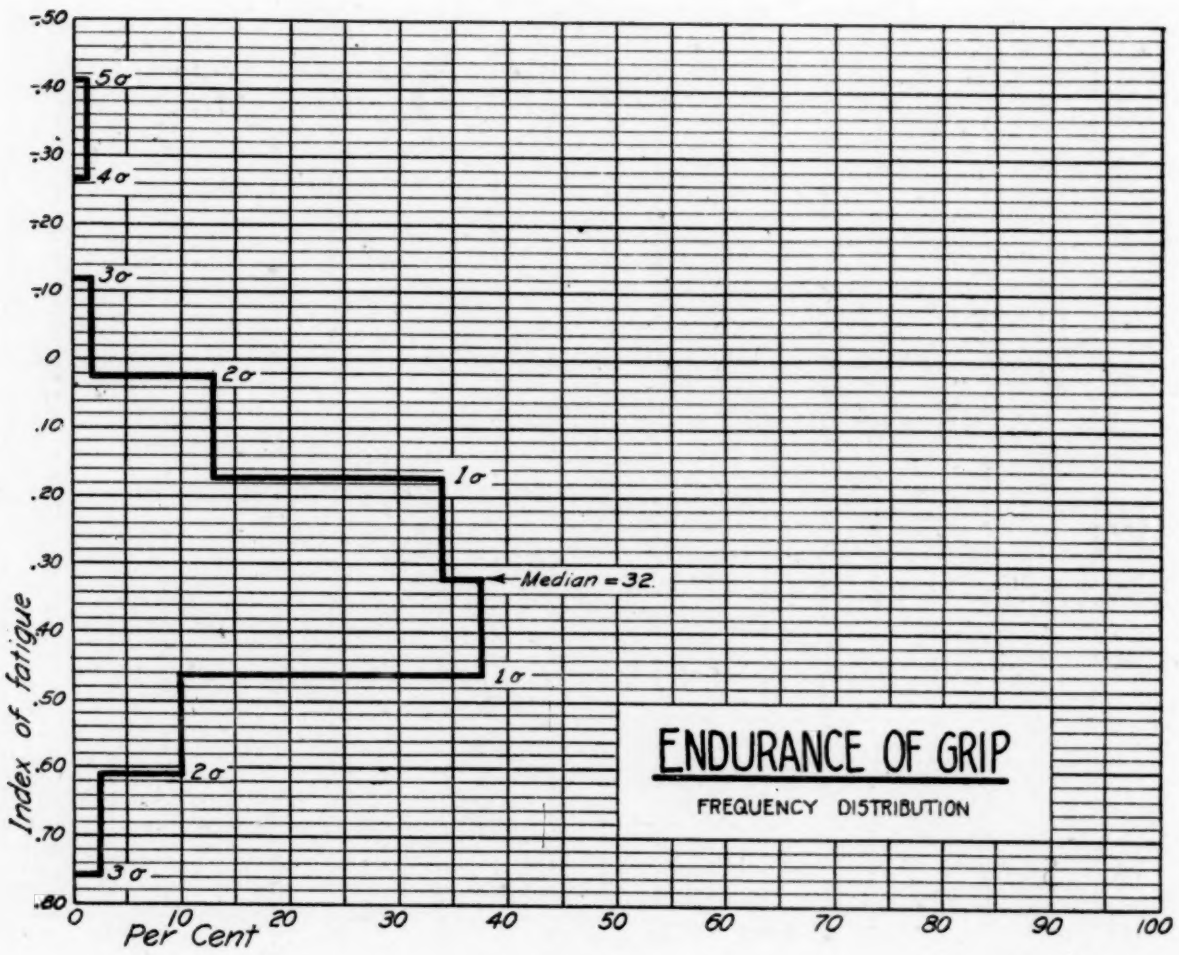
-.50
-.40
-.30
-.20
-.10
0
.10
.20
.30
.40
.50
.60
.70
.80
Index of fatigue
5σ
4σ
3σ
2σ
1σ
Median = 32.
1σ
2σ
3σ
ENDURANCE OF GRIP
FREQUENCY DISTRIBUTION
0
10
20
30
40
50
60
70
80
90
100
Per Cent

FIGURE VIII.

A POINT SCALE FOR THE MENTAL MEASUREMENT OF THE BLIND[1]

THOMAS H. HAINES

Ohio State University, Clinical Director of the Bureau of Juvenile Research, Columbus, Ohio

The Bureau of Juvenile Research had an opportunity to make mental measurements of the 224 blind pupils of the Ohio State School for the Blind in May, 1915. This opportunity resulted from the superintendent's desire to know who of his pupils were feeble-minded; some of them were so evidently deficient in mental capacity that any layman would know them to be defectives. The question as to who were defective, however, in this day of mental measurement, was naturally put to those who have skill in mental measurement. The opportunity also came from another quarter. The Supervisor of Instruction for the Blind in three cities in Ohio: Cleveland, Cincinnati and Toledo, had long felt the need for accurate testing of the mentality of blind children. Mr. R. B. Irwin was really the instigator of our work at the Ohio School for the Blind. From the point of view of such day school work as that of Mr. Irwin and from the point of view of the superintendent of a large boarding school, such as our State School, it is important to have a measuring scale for the intelligence of blind persons similar to the scales in use for seeing persons. It is as desirable to separate the feeble-minded blind at the beginning of their school careers, or as soon as feeble-mindedness becomes evident, as it is to separate the feeble-minded seeing children from the normal. The feeble-minded blind should have the benefits of special education, and the schools for the blind should be relieved of the burden of carrying feeble-minded children along in the regular school course.

It became evident, at once, that several of the Binet tests cannot be administered to blind persons. Of the Binet tests adopted by Yerkes and Bridges in their point scale for mental measurement these are impossible for the blind:

[1] Full description of the tests, and instructions for administering them, together with the results of this survey, are being published by the Psychological Review Company as a Psychological Monograph.

1. Binet pictures.
2. Comparison of 5 and 6 cm. lines.
3. Copying square and diamond.
4. Resisting suggestions in lengths of lines.
5. Choosing the prettier of two pictures.
6. Pointing out omissions in outline pictures.
7. Drawing from memory the two Binet figures.

We set about constructing a point scale for the blind on the outline devised by Yerkes and Bridges, and made substitutions, in so far as possible, for the above mentioned tests. For the enumeration of objects in pictures we adopted Mr. Irwin's suggestion of placing before the blind subject a box in which there were eight articles: a doll, a penny, a marble, a base ball, a spoon, a shoe string, a baby shoe, and a coat button. The subject was asked to lay these pieces out upon the table, one at a time, as he named them. As a substitute for *resisting suggestions* of the Binet lines we used Irwin's wooden cubes. Cubes of wood, measuring 15 mm., 22 mm., 29 mm., and 36 mm. were used. The 22- and 15-mm. cubes were placed in the subject's right and left hands, respectively, and he was instructed to give back the biggest cube. Then the 29- and 22-mm. cubes were placed in his right and left hands, respectively, with the same command. Next the 36- and 28-mm. cubes were placed in his right and left hands, respectively, with the same command. Then followed, three times over, the placing of two 36-mm. cubes in his two hands with the same command. If he continued, in these last three cases, to give back the right hand cube as the larger, he *failed to resist the suggestion;* if, on the other hand, he gave back the left hand cube as the larger, or said that the two were equal he resisted the suggestion. He received one point credit for each one of the three cases in which he resisted the suggestion.

For the 5 and 6 cm. lines, concerning which judgment of relative lengths was required, Mr. Irwin had suggested using two sticks, 4 and 6 cm. long. These sticks are put into the subject's two hands and he is told to hand back the longer. They are then reversed, and the same command repeated. If he gives back the longer, both times, he receives one point credit for the performance. For the esthetic choice between the pairs of outline pictures of Binet, Irwin had likewise suggested comparisons

of fabrics as substitutes. The following pairs were adapted: (1) serge and silk; (2) velvet and serge; (3) velvet and Brussels carpet. Choices of (1) silk, (2) velvet and (3) velvet, made two times over, in each case, secure three points credit on the Point Scale. The disarranged sentences were given to the observer in *New York point,* with due separation of words—all of the words of each sentence being on one line, and without capitals. The subject was asked to read the words, and the words were repeated to him so that the examiner was assured the subject knew the words before he was asked to arrange them in a sentence. Two points credit were allowed for each one of the three sentences correctly arranged. For the other tests, namely: the two drawing tests, and the missing parts of pictures, no parallels have been found suitable for administration to the blind. Other tests were added to the Point Scale for the blind as follows:

(1) Goddard's Adaptation Board. A board measuring 22 x 28 cm., in which are four round holes, three of which measure 62 mm. in diameter, while the fourth measures 65 mm. in diameter; and a circular block twice as thick as the board and measuring 65 mm. in diameter so that it fits snugly into the larger hole, constitutes the apparatus. Two points credit are allowed for the correct peformance in four positions different from the demonstration position; and one point credit for correct performance in any three of these four positions. The subject is allowed to follow the movement of the board, in changing positions, with his hands.

(2) The Size-Weight Illusion. In this test two wooden cylinders of the same weight (55 gm.) and same length (35 mm.), but of different diameters, one being 19 mm. and the other 61 mm. are put into the two hands of the subject and he is asked to give the examiner the heaviest one. If he gives the smaller as the heaviest, and repeats the same performance when the cylinders are reversed in his hands, he is allowed one point credit.

(3) Orientation. (a) The examiner sat down opposite the subject with his hands upon his knees and explained to the subject that he was sitting opposite to him and that his hands were upon his knees. He was then asked to be careful, take thought before he acted, and then to place his hand upon the examiner's right hand. If he did this correctly, and also placed his hand correctly upon the examiner's left hand, he was allowed one point credit. (b) A further test in orientation consisted in this: The subject was asked to stand; he was so placed that he

faced the north, and was told he was facing the north. He was then asked to point successively to the east, the west, and the south. Likewise, he was faced to the east, and told he was facing the east. He was then asked to point to the south, the north, and the west. Correct pointing in all of these directions in both positions was credited with two points. Correct performance of all three in either one of the two positions, that is: when facing north or when facing east, was given one point credit.

(4) Finger Tapping: The Knox cube test, as revised by Pintner,[2] was adapted to the blind as follows: The subject was asked to place his left hand (if right handed), with palm upward, upon his thigh. He was asked to hold the hand comfortably relaxed, but with the fingers reasonably well spread out. The examiner took the index finger as point *one* of the Knox cube test, and the little finger as point *four*. Of course nothing was said of this to the subject. To the subject it was explained the examiner would touch his finger tips with the rubber end of a lead pencil, and that he would then put the pencil into the subject's right hand and ask him to touch the finger tips of his left hand in the same way the examiner had done. Illustration of touches on the finger tips and the way the pencil would be put into his own hand were then given. Line A 1, 2, 3, 4 was then tapped out upon the finger tips of his left hand, the pencil put into his right hand, and he was asked to do the same. Line A was considered a practice line and not scored. X, Y, B, C, D, E, F, and G, were each given one point credit for correct performance.

(5) Terman's Test, Reversing Series of Digits, was adopted. Any one of three trials, proving correct, was allowed one point credit for each number of digits from three to six inclusive.

With these modifications of the Yerkes-Bridges Point Scale our record blank for a point scale for the mental measurement of the blind, contains twenty-two tests, and provision for one hundred points of possible credit. This point scale was used in testing 142 of the 224 pupils at the Ohio School for the Blind. The other 82 pupils had sufficient vision to take the regular Binet and Yerkes-Bridges tests. The point scale achievements showing the subjects' records arranged in the chronological year groups, by their nearest birthdays, follow:

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[2]Cf. *The Standardization* of *Knox's Cube Test*, by Rudolf Pintner. The Psychological Review, Sept., 1915, p. 395.

TABLE I.

Points Scored on the Point Scale for the Blind, by the One Hundred and Forty-two Blind Subjects of Groups 1, 2, and 3, Arranged in the Chronological Year Groups of the Subjects, and in the Order of Points Scored, with Median and Average Attainments.

Ages	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX	XX	XXI	XXII	XXIII	XXIV
Scores	44	36	15	41	28	23	60	62	66	42	74	76	65	78	61	66	76	86
		48	24	41	44	37	60	64	71	67	75	81	73	80	73	70	81	
		52	43	44	47	57	64	66	74	79	78	82	76	81	83	93		
			46	44	50	58	69	66	84	80	83	88	78	83	90	97		
			52	49	57	58	73	71	87	86	89	92	85	86	91	98		
				52	59	64	77	72	88	87	92	93	87	91	91			
				56	59	74	83	78	90	89	93	94	87	92	93			
				59	59	81	84	83	91	93	94		90	97				
				60	66	82	90	84	92	96			92	97				
				62	69	87		84					94	98				
				64	70	88		88					98	99				
				65	79			90										
				67	83			91										
				72	87			93										
				73														
Median	44	48	43	59	59	64	73	80.5	87	86	86	88	87	91	90	93	78.5	86
Av. Dev.		5.3	11.8	9.0	11.3	16.3	9.0	9.5	7.4	10.8	7.2	5.7	7.6	6.8	8.3	11.8	2.5	
Averages	44	45.3	36	56.6	61.2	64.4	73.3	78	82.5	79.9	84.7	86.6	84.1	88.5	83.3	84.8	78.5	86

At 7 years one subject made 44 points.
At 8 years three subjects averaged 45 points.
At 10 years fifteen subjects averaged 57 points.
At 11 years fourteen subjects averaged 61 points.
At 12 years eleven subjects averaged 64 points.
At 13 years nine subjects averaged 73 points.
At 14 years fourteen subjects averaged 78 points.
At 15 years nine subjects averaged 82 points.

Sixty-one subjects, sixteen years and beyond, ranged up to 88 points in averages for year groups. The irregularities of the later adolescents' averages are somewhat more marked than the averages up to fifteen years inclusive.

Nine 16 year olds, for example, dropped to 80, seven 18 year olds averaged 87, and eleven 19 year olds averaged 84. This irregularity is slight, and indicates that the school population in question is over-weighted with old defectives, and that these are not regularly distributed through the chronological year groups. Statistics from a larger number of blind persons would iron out these irregularities. It is highly desirable to have more data from the use of this point scale for the blind children of ten years and less. The data at hand from ten years to fifteen inclusive are very satisfactory, both in the consistent advances which the averages make from year to year, and in the close paralleling from similar data from seeing children, as reported by Yerkes and Bridges. These data afford a reasonable basis upon which to classify blind children of these ages and older, with respect to their intelligence development. For example, one of our subjects twelve years of age scores 23 points, while the average for twelve year olds is 64 points. He must, without any question, be rated as feeble-minded. Likewise a sixteen year old, who scores 42 points, while the average for sixteen year olds is 80 points, and 42 is apparently about what can be expected of a nine year old blind child, must, unquestionably be rated as a high grade defective having a mentality near that of a nine year child.

Likewise a 21 year old makes 61 points, which is the average attainment of eleven year old blind children. This subject must be rated as subnormal, or a border line case, and must be reckoned with as needing more care than as ordinary blind person. He should have had special education along industrial lines,

and must have more than ordinary attention to enable him to adjust himself to an independent existence.

The Point Scale for mental measurement of the blind proves itself then at once a much more effective means of rating the intelligence of the blind pupils of a given school, than would a partially available year scale like the Binet-Simon. By this means of comparison of each pupil's mental ability with that of every other and with the year group averages, there was no difficulty in rating each one with fairness, and in determining with considerable accuracy who were the feeble-minded. As a result of this examination thirteen were eliminated from the school.

These averages, with our instructions and descriptions of the tests, constitute a basis upon which any one may now measure and rate the intelligence of any blind person ten years or more of age.

DISTRIBUTION OF PRACTICE PERIODS IN LEARNING

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Those engaged in the administration of education feel a need of more knowledge in regard to the matter of distributing the learning periods. Much time is given to the arrangement of the program of studies in regard to the subject matter, but not so much attention is given to the more important question of how to arrange a program that will be most profitable to the learner.

PROBLEM STATED

How shall the periods of learning be so distributed as to give the most economical result? This problem is of especial interest to educational psychologists who have made experiments in both animal and human psychology in an effort to solve it.

PREVIOUS EXPERIMENTS

In regard to periods of work up to a limit of twenty or thirty minutes, the conclusion has been reached that one practice period per day gives better results than any other larger number per day. Lashley found in archery practice that the group which made five shots per day showed greater improvement for the same number of shots than those who made twenty shots or forty shots per day.

As yet, no conclusion has been reached in regard to the value of alternate days' practice compared with daily practice. Pyle, from his experiments in transcribing reading matter into new characters, concluded that daily practice is better than practice on alternate days. He had, however, only six subjects in the test, and, even to this conclusion, he adds that after the initial stages alternate days may be better.

Professor Leuba and Miss Hyde of Bryn Mawr have added some information to this question in their tests on "Hand Movements." Their test was to find out the progress in skill in writing English prose in German script. Four divisions were made of their subjects: One group working twice per day, one daily, one

on alternate days, and another every third day. From the chart on page 41 will be seen in the progress, as noted, very little difference between the alternate and daily practice groups, but in comparing them with other groups a decided showing is found in favor of the daily and alternate-day groups. One defect in this comparison is the short length of the curve. The indications are that with further practice the alternate group would compare yet more favorably. The table below shows that at the end of the tenth trial the group working on alternate days was superior.

Twice per day	Once per day	Alternate days	Every third day
865 (Words)	1115	1175	985

Technique of Experiment

The following experiments were devised to test the relative merits of daily and alternate day's practice in such muscular activity as javelin throwing. Although such was the chief function of the experiment, yet other practice periods were given to different groups. There were twice per day and once per week groups. Some data will be shown as the result of the latter. The most careful study was given to the five-times-per-week, the three-times-per-week, and the once-per-week groups.

The experiment was performed with normal school girls from the senior and junior classes. Three groups of ten girls each from the senior class were formed for the five times, the three times, and the once per week work, respectively, and two groups of seven each from the junior class. One group threw five times per week *daily* and the other twice per day, the latter making five throws in the morning at 8:45 and five in the afternoon at 3:00.

I shall designate the group that threw five times per week from Monday to Friday as Group I; the group that threw three times per week, Monday, Wednesday, and Friday, as Group II; the group that threw once per week on Thursday as Group III.

Apparatus and Method of Experiment

The following description will explain the arrangement of material used in the experiment. A soft pine board about 70 cm. square was firmly fastened to the wall of a classroom. In the center of the board a small spot 1 cm. in diameter was painted. This was the target and was put at the height of 150 cm. from the floor. Twelve feet from the target a chalk line was drawn on

the floor. When the subject made the throw she placed her toe on this line. The javelin was handed to the thrower and she was told to hit the target, throwing with the left hand. After each throw an assistant handed the javelin to the performer so that her position was not changed. No other directions were given nor was any comment to be made upon the result of any throw. Only the persons helping in the experiment were in the room and generally only one subject came to the room at a time.

Selection of Groups

The thirty students in the senior class were given a trial throw on Monday, Nov. 9, at 1 P. M. Each person was asked to throw five times with her left arm. If she was accumtomed to using her left arm for throwing, she was excused from the experiment. The distance was found to be of such length as to require some effort, and yet was not beyond the strength of any of the performers, with, perhaps, one exception. After the thirty girls had thrown five times, the average of the five throws was taken as a measure of possible ability and groups were then formed so as to have ten in each whose ability would be about equal. The are the figures showing the relative abilities as evidenced in the follxwingtest throwing:

Average in Centimeters of Ten Girls for Five Throws

Group I	Group II	Group III
86	85.2	85.5

No attempt was made at introspection while the students were throwing, but the difficulty experienced in performing the task was plainly evident. The erratic throwing and the new situation aroused an emotional attitude in most of the girls and called forth such expressions as "I'll never do it," "I never could do anything with my left hand," etc. Such conditions persuaded us that we were attempting to form a pattern in the nervous system whose elements had very little past association. It seemed that here was some virgin soil upon which might be grown habits whose growth, if carefully noted, would yield some evidence of the conditions which would be most favorable for improvement.

Some one interested in formation of habits which pertain to schoolroom work may ask, "What can you carry over from such an experiment that will throw any light on solving problems of

learning in school?" Learning is making connections in the nervous system. These connections are supposed to be formed by the impulse breaking over or through the synapse. What difference can there be in forming this connection in the neurones controlling the movement of the arm and those controlling the cortical set that responds with a rule in grammar or any word response? Thorndike says that the same law of behavior in the neurones will be found to account for the effects in both typewriting and the learning of nonsense series. There are connections lacking in both places. Of course phylogeny may explain to us that neural bonds which are made in such movements of hand and arm are older in the race's history and therefore easier to form anew than the so-called higher connection; but who can prove that the same methods of improvement will not avail for all neurones? Many school habits of motor type are very similar to habits formed in this experiment and it will not be useless for the pedagogue to consider such lessons as the experiments in skill may have to give. The great objection to the so-called mental tests (as Dr. Watson states) is to be found in the fact that the complexity of the word habits makes it difficult to have any assurance that many past associations are not entering into the supposedly new arc formation.

We state these reasons not as an excuse for our experiments but as an explanation of why we consider such work a good source from whence pedagogy may derive some help. The more isolated the arc formation the more easily conditions can be controlled.

Procedure of Experiment

Winch states that one ought to have an experiment planned so that whatever bias the experimenter has may have the harder part of the problem. If there was any bias in the mind of the experimenter it was in favor of daily practice, but the conditions were absolutely the same for all the groups, and a careful daily watch was kept on any point or outside influence that would affect the results. At 2:30 P. M. on Wednesday, Nov. 11, Group I began their throwing and threw on each succeeding school day until they had had thirty-four practice periods. At 1:00 P. M. on Wednesday, Nov. 11, Group II made their first throw in the experiment and continued to throw every Monday, Wednesday, and Friday, until their practice periods numbered thirty-four. On Thursday, Nov. 12, at 1:00 P. M.

Group III commenced their practice of once per week. They have not had an opportunity to have as many practice periods as the other two groups, but their progress is noted in comparison with the other two groups in Fig. 1. This graph is made from the total of daily averages for each group.

It will be seen that the initial improvement was somewhat more marked in Group I than in Group II; but from the middle of the practice periods the improvement of Group II is very much faster than that of Group I. At the end of the twenty-third practice period for Group I came two weeks intermission for the Christmas Holidays, and you will notice a perceptible rise in the curve at that point. This point is marked on all the curves by an X. Not so marked, however, is the rise of Group II showing that the lapse of time made very little perceptible difference. It should be noted that in Group II one of the girls was very slow in learning; in fact, from a glance at her score in Table V it will be seen that there was little improvement. Her high score was handicap to her group whose progress would have been still more marked in comparison with Group I. (By high score we mean far from target and by low score near target.) There were some making high scores in Group I, but none that seemed to have as much difficulty in reaching the board as the subject in Group II. It might have been more exact not to count this subject in the result, as her high score was due to the fact that so many throws fell short of the target, showing lack of strength. This omission would add to the favorable result for Group II.

In Table I you will note the sum of the scores made by Groups I and II. Comparing practice periods at each stage it will be seen that Group II makes a lower score in nineteen periods out of the thirty-four. The result given in the table shows the progress that was evident to the observer. Those in Group II (with one exception) appeared more confident and handled the javelin with more ease and accuracy, as will be shown from the median and the standard deviation in Table VI.

The dotted line on the graph shows the progress of Group III. Although the test practice gave evidence that Group III was equal to the other groups, yet on beginning practice this group made the best score. On the fourth and fifth practice they made a higher score than Groups I or II, but from the fifth practice there was rapid improvement to the thirteenth, when a lower score than either of the other groups was reached. In fact the

TABLE I.

Average for Two Groups

Group I Ave.	Group II Ave.	Group I Ave.	Group II Ave.	Group I Ave.	Group II Ave.
*80.01	82.24	57.25	62.92	56.16	46.96
67.41	72.90	53.35	63.18	51.49	46.48
75.42	76.61	54.66	53.42	58.17	46.96
70.33	76.41	66.25	64.14	47.80	51.77
68.60	68.19	57.59	63.06		
74.33	65.30	52.95	60.49	*Daily Average for Each of 9 in Retention Test*	
71.95	57.91	57.79	59.49		
71.42	63.50	58.14	55.47		
75.97	61.66	66.16	48.72		
74.57	68.42	58.57	46.53	Group I	Group II
73.43	74.77	68.81	43.93		
57.35	59.17	57.58	47.89	59.0	50.7
50.81	60.91	55.64	42.39	53.6	45.6
57.48	70.51	70.78	40.58	55.5	53.0
53.22	67.76	61.26	50.21	45.9	46.3

TABLE II.

Trial Practice

Group I		Group III		Group II	
Miss Hu.	38.4	Miss Co.	39.4	Miss So.	45.4
" He.	57.4	" C.	54.9	" Vo.	46.2
" Hei.	59.1	" Hip.	59.5	" Fr.	59.8
" Lau.	69.2	" Ha.	67.4	" Do.	64.2
" Sk.	70.0	" Ho.	72.5	" McK.	79.3
" Jo.	88.9	" B.	84.8	" Har.	79.7
" McC.	88.9	" Lit.	93.2	" Br.	94.6
" Wh.	110.4	" W.	104.8	" St.	103.8
" Du.	120.2	" Col.	129.7	" Ru.	137.6
" Ru.	158.2	" Ma.	149.2	" Jac.	141.9
	860.7		855.4		852.5

TABLE III.

Median and Standard Deviation Sheet for Five Times per Week Group

	1st 50		2d 50		Last 50	
	Med.	S. D.	Med.	S. D.	Med.	S. D.
Miss H.....	45	32.52	42	25.8	39	23.6
" He.....	105	46.4	63	33.4	40	24.72
" Hei.....	60	38.0	56	24.6	41	23.35
" La.....	50	37.65	35	34.0	57	35.0
" S.....	39	29.34	40	28.6	50	37.3
" J.....	65	45.51	43	23.4	45	28.8
" McC.....	77	36.79	32	33.3	35	25.0
" W.....	63	44.6	65	39.7	53	30.5
" Du.....	120	40.29	78	42.9	75	53.2
" Ru.....	46	42.0	53	35.9	52	38.2
Av. Total.....	67.0	39.31	50.7	32.16	48.7	31.96

* Average number of centimeters from target.

score at this point was lower than any score made by Group II until the twenty-fourth practice period and lower than any reached by Group I until the very last day or the thirty-fourth practice period.

From this result we do not draw any definite conclusion in regard to the efficacy of distribution for once per week, but the curve does indicate that for such work as was performed in this experiment one period per week gives a good distribution for learning.

Accuracy of Learning

By looking at the standard deviation and median, Table VI, one will note that there was improvement in both Group I and Group II for average median and for average standard deviation

TABLE IV.

Median and Standard Deviation Table

(once per week)

	1st 50		2d 50	
	Med.	S. D.	Med.	S. D.
Miss Co.	55	34.7	50	29.4
" C.	78	48.1	40	28.2
" Hip.	40	25.9	28	19.0
" Har.	75	51.4	75	35.0
" Ho.	63	38.9	45	28.3
" B.	43	28.7	54	31.5
" L.	48	21.3	43	22.3
" W.	110	45.3	55	30.19
" C.	73	32.5	51	29.6
" M.	92	55.8	41	33.1
	677	382.6	482	286.5

TABLE V.

Median and Standard Deviation Sheet for Three Times per Week Group

	1st 50		2d 50		Last 50	
	Med.	S. D.	Med.	S. D.	Med.	S. D.
Miss So.	59	36.4	37	23.5	33	17.2
" V.	49	27.1	55	28.0	40	18.5
" F.	61	36.3	54	32.6	46	34.0
" D.	69	32.5	30	16.3	32	16.3
" McK.	60	35.8	55	27.0	42	23.5
" H.	56	42.0	55	31.0	40	31.2
" Br.	90	45.8	48	51.9	51	36.5
" St.	61	39.9	62	27.9	31	19.4
" R.	77	41.3	41	32.5	45	23.0
" Ja.	122	49.6	158	45.4	75	52.8
Av. Total.	70.4	38.67	58.5	31.61	43.5	27.24

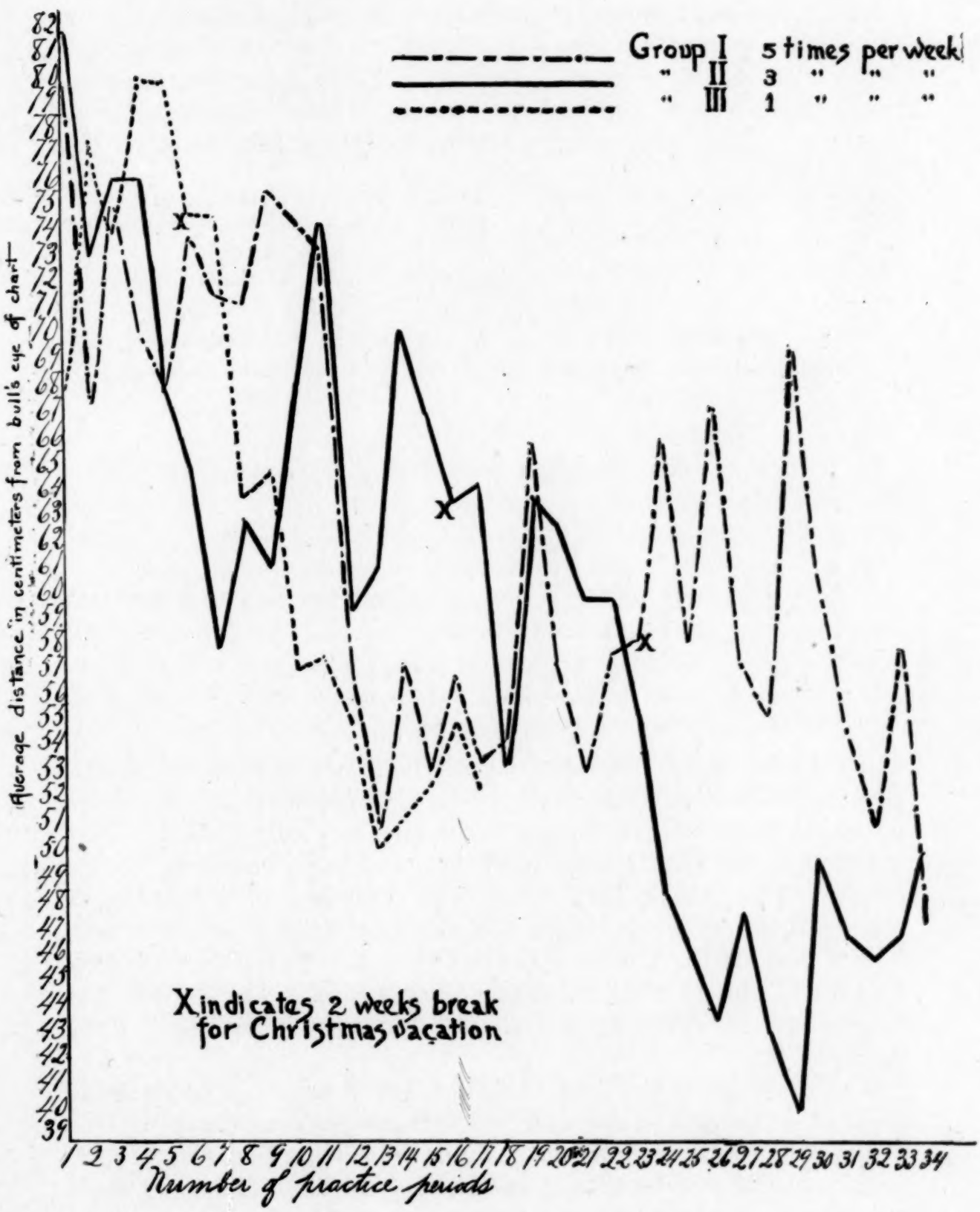
Group I 5 times per week
" II 3 " " "
" III 1 " " "
Average distance in centimeters from bull's eye of chart
X indicates 2 weeks break for Christmas vacation
Number of practice periods

TABLE VI.

Comparison of Average Median and Average Standard Deviation for the Three Groups

	1st 50		2d 50		Last 50		Retention Test	
	Av. Med.	Av. S. D.	Av. Med.	Av. S. D.	Av. Med.	Av. S. D.	Av. Med.	Av. S. D.
Group I	67.0	39.31	50.7	32.16	48.7	31.96	50.0	32.2
" II	70.4	38.67	58.5	31.61	43.5	27.24	45.0	24.3
" III	67.7	38.26	48.2	28.65				

TABLE VII.

Junior Score

Group I		Group II	
Once per day—10 consecutive shots		Twice per day—5 shots each time	
Total score		Total score	
1. 5926	14. 3915	1. 7077	14. 4336
2. 4881	15. 3850	2. 6024	15. 4347
3. 5381	16. 3747	3. 6765	16. 4343
4. 3973	17. 4284	4. 5518	17. 4480
5. 3415	18. 3965	5. 6537	18. 4416
6. 4500	19. 4107	6. 6169	19. 4359
7. 3954	20. 3706	7. 5392	20. 4121
8. 3647	21. 4230	8. 5113	
9. 3635	22. 3591	9. 4766	
10. 4049	23. 3031	10. 4325	
11. 4331	24. 3714	11. 4029	
12. 4058	25. 3668	12. 4693	
13. 3872		13. 4010	

from the first fifty throws to the middle fifty and from the middle fifty to the last fifty throws. In both the median and deviation averages Group II led Group I, showing not only that the score was lower but that greater accuracy had been obtained by this group. The middle fifty group was composed of the fifteenth, sixteenth, seventeenth, eighteenth, and nineteenth practice periods. These periods for Group I came before the Christmas holidays and for Group II after vacation. Vacation appears to have had a pronounced effect upon Group I but very little effect upon Group II.

The progress of the girls in Group III is very marked both in their total daily average and in their accuracy as shown by the median and standard deviation made from their first fifty throws and from the middle fifty. In the last set of figures they show an improvement over both Group I and Group II. It must also be added that the middle fifty for Group III was composed of the thirteenth, fourteenth, fifteenth, sixteenth, and seventeenth

practice periods, and that of the other group was composed of the fifteenth, sixteenth, seventeenth, eighteenth, and nineteenth practice periods. A very favorable result is thereby shown in the once per week practice period. From observation of the movements and control shown, we are led to conclude that such a distribution is very effective for learning.

Comparison of Ten Consecutive Shots per Day with Five Shots Twice per Day

On Nov. 9, at 2:30 o'clock, a preliminary throw was given to 14 Junior girls. Each one threw five times. A division of the class was made in order to get seven of equal ability. The following totals show how nearly equal their first efforts were:

Group I	Group II
69.7 cm.	69.4 cm.

Group I is the group that shot twice per day at 8:30 A. M. and at 3 P. M. Group II represents those shooting once per day at 2:30. Monday, Nov. 16, Group II began regular practice and continued for twenty consecutive school days. You will note the improvement made from the first to the ninth practice. Notwithstanding the fact that at this point came five days of vacation but a small increase in score was made. There was a month's intermission from Dec. 16 to Jan. 13. Although the first practice after the pause was 4230 compared with 3706 of the last regular practice period, yet the second of the delayed series was 3591 and the third 3031, showing greater improvement after the pause.

Tuesday, Nov. 17, at 8:45, Group I commenced regular practice and threw each consecutive school day. The initial score for this group was higher than for Group II. The improvement, however, was rapid. We did not work out a table of standard deviation for this group but a comparison of daily averages will show that progress was better for those throwing but once per day. Those that threw twice daily had the advantage of a morning hour (8:30) for first trial but very little difference was noted in results from the five throws in the morning and from those in the afternoon at 3 P. M.

Retention Test

Monday, March 22, a retention test was commenced for the two groups, I and II, of senior girls. Ten throws were given daily for five days to each member of the two groups. Owing

TABLE VIII.

Retention Tests

(Given March 22–25, comparing nine in each group)

	1st day	2d day	3d day	4th day
Total Score Group I.....	5310	4830	4996	4131
" " " II.....	4567	4108	4813	4171

	Group II			Group I	
	Med.	S. D.		Med.	S. D.
Miss S.	33	13.0	Miss Hu.	34	26.0
" F.	57	21.6	" He.	50	34.8
" D.	34	24.3	" Hei.	45	31.0
" Mc.	43	27.0	" La.	44	30.1
" H.	39	22.1	" Sk.	60	52.7
" Br.	49	27.0	" Jo.	40	16.0
" St.	35	21.1	" McC.	45	22.4
" R.	34	18.7	" Dn.	65	34.5
" Ja.	85	44.0	" Rn.	68	32.7
	9)409	2)218.9		9)451	9)290.2
Ave.	45.4	24.3		50.1	32.2

TABLE IX.

Comparison of Good Shots with Shot Following

Taken from last 50 or middle 50

(Showing 28 out of 50 shots following good shot were above median)

Good Throw	Med.	Next Throw	Good Throw	Med.	Next Throw
11	45	51	7	32	15
1	41	91	8	40	90
1	50	68	8	40	48
4	40	42	10	34	30
10	39	15	10	42	21
3	35	40	4		70
5	35	55	6	46	13
6	52	19	7	32	15
7	40	19	7	40	29
10	39	80	3	37	58
10	45	27	1	46	62
5	50	80	7	41	20
6	53	71	8	41	40
10	53	81	9	55	28
6	39	20	4	37	46
3	45	45	6	42	43
8	40	10	1	37	39
10	42	43	7	41	60
6	43	53	8	30	60
5	78	74	6	48	65
10	42	65	7	55	26
7	63	69	6	30	37
6	42	26	6	62	47
7	32	110	3	30	46
10		49			
9		124			

to the illness of several members, we could not obtain all ten girls for each day's trial, and, therefore, to make the comparison easy and just to both, we have worked out the median and standard deviation for the first four days or for forty throws for each individual, taking nine from each group. The table of these results is given on page 20. The median for Group II was 45.4 and for Group I, 50. The standard deviation for Group II was 24.3 and for Group I, 32.2.

On account of irregular practice at this period the score of one of the best performers in this group is not counted, yet the results indicate better retention for the alternate-day group. The most inefficient worker, Miss J., is counted in that test. The rest period for Group I was, however, longer by three weeks than for Group II. Had it not been necessary to close the experiment it would have been better to postpone this test several months longer.

Conclusions

From a study of the results in the above experiment, and from a careful study of the attitude of those throwing the javelin, we conclude that learning periods can be distributed by giving alternate days practice, and even weekly practice, without any loss in learning. We believe this to be a conservative statement not only for practice periods involving skill or hand manipulation but also for so-called mental work. We believe we are justified in stating that better work, for the amount of time expended, can be done in our schools through a distribution of three times per week than through a distribution of five times per week.

In the above experiment the curves did not follow the normal curve of learning to any marked degree; but those in the alternate-day group generally gave a better approximation to a regular learning curve. This is especially noted in the curve of Miss D. of Group II. If there is any scientific explanation as to why such a distribution is more economical we may find it in the suggestions of Book that conflicting associations tend to disappear in the periods of rest. We must however give some explanation of the fact that the useless arcs disappear sooner than the useful arcs. Watson gives more prominence to frequency than to any other factor in the learning process, and also lays great emphasis on the fact that thought processes affect the whole musculature of the body. During the rest periods, the subjects, no doubt,

give some thought to the practice in which they are engaged, *but only to the perfect movement they wish to make.* This may serve as suppressed practice for the useful arcs and if the period of rest is of sufficient length a greater handicap is given to the proper *arc* formation.

Surely something like this must explain what the psychologists mean by "attentive repetition's" being necessary for all learning. Learning is a *subtraction* process to a greater extent than an addition process. The Pauline trouble is with all learners in that it is the things we would not do that overcome the useful things. This is illustrated by the table showing the high score made after good throws. It appears that the successful throw turns loose a host of useless arcs which destroy the power of the useful connections. These unwelcome arcs are the cause of much slow learning, and longer periods of rest from those practice periods in which the useless arcs have a part is one way suggested by which we may attain more economical learning.

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COMMUNICATIONS AND DISCUSSIONS

MENTALITY TESTS

In view of the prevailing unrest in regard to the present status and the future of the Binet tests and related tests, the following extracts taken, with permission, out of a personal letter from Professor Yerkes may be of helpful interest:

"We seem to be in perfect agreement as to the direction for further work. I believe that the age arrangement of tests is wrong in principle, violating the laws of mental development. For this reason, I have to reject the age scales. Something like the Point Scale system still appeals to me as most promising, and I believe I am in agreement with you in considering the development of a number of special point scales as highly desirable.

"My present feeling is that I should like to follow out some such plan as this to test its value: (1) Develop three relatively simple scales for measuring intelligence, the application of any one of which would take not more than thirty minutes. These would consist of (a) a scale for the age range 0 to 48 months; (b) a second scale for the age range 49 to 144 months; (c) a third scale for the age range 145 months on to maturity (approximately 16 years). I have decided that it is not feasible to try to use a single point scale for all ages and that three scales constituted somewhat like the one we are now using for pre-adolescents will probably prove most feasible.

"These three intelligence scales I should propose to supplement by the development of scales for such special mental functions or groups of mental functions as (1) the receptive processes; (2) the presentative processes, possibly separating reproductive and creative imagination; (3) the ideational processes; (4) the affective processes.

"When one attempts to work out these special scales it may become evident that yet others are desirable.

"The status of my own work is this. Instead of pushing ahead with the development of the universal scale, a plan for which I announced last year, I have, with the aid of one of my assistants, developed an adolescent-adult point scale for the measurement of intelligence. This we are now trying out in a preliminary way prior to having record blanks printed. This scale requires at least an hour, and I must say that although the numerical result may not satisfactorily indicate intellectual capacity at the upper limit, the experienced psychologist obtains through the application of the scale most valuable insight into the mind of the subject.

"What a committee might do at present is extremely difficult to decide. I am most eager to see, first, the complete abandoning of all forms of the Binet scale except some such as the Stanford Revision,

and from what I have written above, you will of course perceive that I do not believe in the correctness of it. Terman has done an excellent piece of work, and I should hate much to have to say that its results should be thrown away. So, in the second place, it seems to me that a committee might, as you evidently feel yourself, attempt to develop measuring scales on the basis of psychological principles and with due care to essential points of method. Possibly it would be wise to ignore the Binet method, and on the assumption that nothing satisfactory exists, to proceed with the development of the sort of thing we think we should have.

"I am planning writing an expository and critical book on mental examining and examiners, to set forth principles and to call attention to the dangerous developments in so-called mental testing."

Psychological Examinations and Examiners: A Critique

Chapter I. Varied demands for psychological examination.
Chapter II. Psychological "testing" versus examining.
Chapter III. The history, principles, merits, and defects of the Binet method.
Chapter IV. Revisions and present status of the Binet method.
Chapter V. The history, principles, merits, and defects of the Point Scale method.
Chapter VI. Scales for the measurement of illiterates and other special groups.
Chapter VII. Modes of expressing the results of mental examinations.
Chapter VIII. Classification according to intellectual status.
Chapter IX. Descriptive psychological examining.
Chapter X. Specialized examining; the intensive study of individuals.
Chapter XI. The psychological examiner.
Chapter XII. The status of mental measurement.

The above frank statement of present point of view and immediate plans of action on the part of such an active worker and leader in this field of research, must be very valuable to those who are interested in this subject. It suggests to me the feasibility and the great need of a symposium on this subject, and I therefore take the liberty of inviting the co-operation of the workers in this field of testing to join in a symposium for which the above letter may be considered a starting-point and a good model. Now let those who have first-hand knowledge of the situation join in this effort, and let us have a simultaneous "showing of hands." Professor Yerkes has set a good example in stating (1) his present view of the situation, (2) what he is doing, and (3) what he thinks should be the next step. Let the criticism be

direct and frank with due regard to present needs and the necessity of temporizing; let each one say what he is actually doing in the use or the improvement of the tests without fear of losing caste or priority; and let each one tell what goal he sees for the immediate future of this work. Adhere to these three features and write briefly at once. Send all communications to the undersigned and they will be included in the symposium in an early number of this JOURNAL—or will go into the wastebasket.

There is need of a new generic term. "Mental tests" has a fairly understood and desirable connotation which should not be disturbed. "Intelligence tests," as now used to designate the Binet tests, is too narrow. Perhaps the expression used in the above title "mentality test" designates the Binet tests and their sequels most adequately. The main reason for the change is of course to designate the fact that the tests are more than tests for intelligence, as the affective and conative aspects must receive due recognition.

Among the problems which stand out most conspicuously for immediate consideration, the present writer sees the following:

1. Differentiation of fundamental traits. To the specific series suggested by Yerkes above, one on motor control should undoubtedly be added.

2. The flat age problem. We must find some way of stating in a really useful way in what respects a child is so many years retarded.

3. The problem of scientific scale units. The age scale has served a good purpose for pioneer work, but we must find some better scheme. What shall it be?

4. Adaptability. How can the tests be adapted to specific needs, *e. g.*, the feeble-minded, the epileptic, the criminal; for occupational guidance; or for public safety?

5. Flexibility. How can we avoid the use of specific questions for which children may be coached?

6. Approximation to the elemental. Tests are faulty in that they depend on particular information or special habits.

7. Regard for the complexity and resourcefulness of human nature.

8. Technical training. The American Psychological Association recently voted that only those who are technically trained in psychology or in the interpretation of such tests shall be trusted to use the Binet tests for diagnostic purposes.

9. Co-operation. What sort of co-operation for the development and standardizing of mental tests is now most needed?

10. Serving present needs. What form of the tests now available shall be used while awaiting further developments?

University of Iowa. C. E. SEASHORE.

THE

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INCLUDING EXPERIMENTAL PEDAGOGY, CHILD PHYSIOLOGY AND HYGIENE, AND EDUCATIONAL STATISTICS

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EDITORIAL

THE DETROIT MEETINGS

Regular attendants on the annual midwinter meetings of the Department of Superintendence and affiliated societies could not fail to be impressed with the degree to which mental tests and educational measurements have increased in prominence on the programs and in the discussions of the members. Three years ago at the Philadelphia meeting, when the preliminary report on educational measurements was made to the National Council, the idea of scientific measurement in connection with educational procedure was so novel that it was with some difficulty that its advocates could gain a hearing. At the Detroit meetings the value of mental and educational tests was so clearly recognized as to leave no doubt that practical educators are looking in this direction for help in the solution of their problems.

On Monday evening the meeting of the National Society for the Study of Education was given over entirely to "Tests and Standards of Efficiency in Schools and School Systems." The program was made up of ten minute addresses by the members of Professor Strayer's committee on such topics as The General Significance of Tests, the

Derivation of Scales in School Subjects, the Work of the Bureau of Research and Efficiency, the Use of Standards and Tests at Salt Lake City, the Value of the Courtis Tests in Arithmetic to Superintendents, Standard Tests as Aids in the Classification and Promotion of Pupils, Completion Tests for Public Schools, and the Use of Mental Tests in the Schools. While it was freely admitted that educational testing was still in its infancy, much optimism was expressed as to its results, both from the point of view of school administration and from that of increasing the efficiency of teaching.

On Tuesday morning half of the session of the National Council was devoted to the same topic—"Tests and Standards of Efficiency"—with such speakers as Professors Strayer, Judd and Baldwin, President Withers, and Superintendents Bliss and Chadsey. On Thursday afternoon the round table of directors of educational research provided opportunity to hear the views of the men professionally engaged in research work in the public schools. Various phases of educational research were considered, as the standardization of teachers' examinations, the application of intelligence tests to elementary school pupils, and the improvement of instruction through educational measurement. At the first meeting of the College Teachers of Education the question of the relation of college and university departments of education to other agencies which have to do with the scientific study of education was discussed by Professors Jessup and Strayer for the universities, by Directors Ballou and Courtis for the city departments of educational research, and by Dr. Ayres and Mr. Flexner for the educational foundations. It seemed to be the consensus of opinion that the initiative in educational research would rest largely with the colleges and universities, that the city bureaus of research were forced to heed the demands of their constituents for immediate results, and that the great foundations could do splendid service by undertaking investigations extending over wide areas and co-ordinating the sporadic and local studies of other agencies.

Two other important features of the meetings were the debate of Director Charles H. Judd, affirmative, and President Carroll G. Pearse, negative, on the proposition "The Best Organization for American Schools is a Plan which shall Divide these Schools into Six Years of Elementary Training and Six Years of Secondary Training"; and the joint discussion of "The Minimum Essentials versus the Differentiated Course of Study in the Seventh and Eighth Grades," between Professors Lotus D. Coffman and William C. Bagley defending a common core of minimum essentials and Superintendent John D. Shoop and Commissioner David Snedden advocating separate courses of study.

J. C. B.

NOTES AND NEWS

The City of Chicago through the co-operation of the school board with the special park commission will have its already excellent system of public playgrounds almost doubled this year. Forty-six new public playgrounds are to be opened this spring. The school board furnishes the ground and allows certain privileges with reference to the use of a portion of the school buildings after hours, while the special park commission keeps the playgrounds in condition, supplies the apparatus, and pays the salaries of the instructors. It is estimated that the average expenditure for each playground is between $8000 and $10,000.

After extended preliminary experimentation the police department of New York City has established a laboratory at police headquarters for the purpose of examining prisoners to detect those who are mentally defective. The laboratory will be in charge of Dr. Louis Bisch.

The *Journal* of the American Medical Association states that the minister of justice has appointed a commissioner to study crime in Chile and to report to the government his recommendations for measures to prevent crime, reform delinquents, and for the classification and separation of prisoners. A laboratory of experimental psychology is to be established in the penitentiary at Santiago, and physicians in penal institutions will be required to furnish information or data in connection with the work.—*Science.*

The Cincinnati school board has been conspicuous in broadening the outlook of public school teachers and enabling them to come in contact with other school systems. Arrangements were made for a temporary exchange of teachers with various cities in this country and in South America, and for giving leaves of absence with part pay to teachers who desire to pursue advanced studies in home and foreign universities. Unfortunately this enlightened policy has been dealt a severe blow by the action of the attorney general of the state, who has recently ruled that such acts involve an illegal use of the school funds.

There will be opened in affiliation with the Carnegie Institute of Technology, Pittsburgh, on June 1, 1916, a Bureau of Salesmanship

Research. A fund amounting to $75,000 for the support of the Bureau for the first five years has been provided by a group of business concerns to whose initiative the organization of the Bureau is due. Among these co-operating concerns are the Westinghouse Electric and Manufacturing Company, the H. J. Heinz Company, the Armstrong Cork Company, the Equitable Life Assurance Society, the Ford Motor Company, the Carnegie Steel Company, and others. Offices, psychological laboratories and equipment have been provided by the Carnegie Institute of Technology.

The aim of this Bureau is to secure a broader basis of established fact for use in improving present methods of selecting and training salesmen, by accumulating and systematizing information concerning the methods now used by successful firms, by applying psychological tests to the analysis of the mental traits of successful and unsuccessful salesmen, by carrying on experiments in the selection and training of salesmen in co-operation with various firms, and by publishing the results of these studies through appropriate channels.

The activities of the Bureau will be guided by a scientific staff, on which Dr. W. D. Scott, Professor of Psychology in Northwestern University, serves as Director, and Professors W. V. Bingham (Carnegie Institute of Technology), J. B. Miner (Carnegie Institute of Technology), and G. M. Whipple (University of Illinois), will serve as co-operating psychologists. The scientific staff will comprise, in addition to the foregoing, a research assistant and several research fellows. The fellowships, yielding from $300 to $500, will be awarded to graduate students of superior intellectual ability, personality and leadership, who intend to fit themselves for careers as employment managers and supervisors of personnel. There will be opportunity also for students of psychology who wish to prepare doctors' dissertations in the fields of mental tests, vocational analysis, statistical method, etc. Inquiries may be addressed to W. V. Bingham, Carnegie Institute of Technology, Pittsburgh, Pa.

The spelling test recently made by Dr. David Spence Hill on 25,000 New Orleans elementary school children from the third to the eighth grades has been completed and tabulated. The tests used were the Ayres lists as employed in Springfield, Ill., and other cities. The general average of New Orleans white children was 74.9 per cent.,—almost five per cent. higher than the 70 per cent. standard set by Ayres. The scores by grades were as follows: Third grade, 65.2 per

cent.; fourth, 76.3 per cent.; fifth, 79.5 per cent.; sixth, 79.2 per cent.; seventh, 77.6 per cent.; eighth, 74.2 per cent. The girls were uniformly superior to the boys, their scores exceeding those made by the boys in each grade from the third to the eighth, as follows: 5.1, 6.4, 3.8, 5.1, 2.5, 2. The 3677 colored children tested averaged 71.9 per cent. The tabulation of the misspellings of specific words in the various grades shows striking variations of difficulty, many of which are not in accord with the ordinary judgments of teachers. Further investigations are being made of the over-lapping of grades in spelling ability, of the relative values of sentence and column tests, and of the relationship between age-grade status and spelling accomplishment.

The first number of the new *Journal of Experimental Psychology*, under the editorship of Professor John B. Watson, Johns Hopkins University, has just been issued. While the editor makes no specific statement as to the policy of the journal, it is evident from the contents of the initial number that the term experimental psychology is to be taken in a broad sense, and that work in mental tests and perhaps even in educational measurements is not to be excluded. In addition to articles on color photometry, on tonal volume, and on the conditions of attention, the present number contains the following articles that will be of especial interest to educational psychologists: "A Graded Series of Geometrical Puzzles" by Grace H. Kent, based upon the Binet divided rectangle; and "Relative Values of Point-Scale and Year-Scale Measurements of One Thousand Minor Delinquents," by Thomas H. Haines. The *Journal* is published by the Psychological Review Company, Princeton, N. J., and the subscription price is $3.00 per year.

Announcement is made of the establishment of a new *Journal of Delinquency*, devoted to the scientific study of problems related to social misconduct, under the managing editorship of Mr. J. Harold Williams, director of the department of research at the Whittier State School, Whittier, Cal. The *Journal* will be published bi-monthly by the school, at the subscription price of $1.25 per year, and Mr. Williams has enrolled as co-workers some of the most eminent students of delinquency in the country.

The Health Messenger, whose volume I, number 1 appeared in February, 1916, is an experiment in co-operation between the vocational interests and the health interests of the public school system of

the city of Albany, N. Y. *The Messenger* is to be issued monthly during the school year by the Albany School of Printing, and the material is to be furnished by the staff of the health director of the city schools. The aim of the publication will be to keep pupils and parents informed of the work that is being done to secure public health, and to enlist their sympathy and co-operation. Dr. Clinton P. McCord, Health Director, is responsible for the enterprise.

The Association of Modern Foreign Language Teachers of the Central West and South proposes the establishment of a *Modern Language Journal* to further the study and teaching of modern foreign languages in American secondary schools and colleges. The president of the Association is Professor Arthur G. Canfield, of the University of Michigan.

Bates College has received $15,000 towards the endowment of a chair of education.—*School and Society.*

The third annual conference on Educational Measurements will be held at the University of Indiana April 14 and 15, 1916. The speakers from abroad will be Dr. B. R. Buckingham, educational statistician for the State of Wisconsin, and Professor Ellwood P. Cubberley, Leland Stanford University. Dr. Buckingham will speak on "Principles of Scale Derivation with Special Application to Arithmetic, Geography, History and Grammar"; and "Efficiency Indices." Professor Cubberley will speak on "The Significance of Educational Measurements"; "Standard Tests in the Work of School Administration"; and "Measurements Applied to School Financing." In addition Dean W. W. Black will make a "Report on Writing," Professor M. E. Haggerty, now of the University of Minnesota, will report on "Measurement of Reading," Mr. J. Z. A. McCaughan will give a "Preliminary Report on Algebra Tests," Professor E. H. Lindley will speak on "Standardization of Methods of Grading the Pupil's Work," and there will be practical demonstrations in giving and scoring standard tests in algebra, arithmetic, composition, reading and writing.

At the Detroit meetings of the Department of Superintendence and affiliated societies Mr. John D. Shoop, superintendent of schools of Chicago, was elected president of the Department of Superinten-

dence, Superintendent Charles E. Chadsey, of Detroit, president of the National Society for the Study of Education, and Dean Will Grant Chambers, University of Pittsburgh, president of the Society of College Teachers of Education. The next meeting will be held at Kansas City.

The following is translated from the *Breisgauer Zeitung:* "The well-known philosopher Privy Councillor Oswald Külpe, professor of philosophy and psychology, and director of the Psychological Institute at the University of Munich, died after a short illness at the age of fifty-three years. With him the world has lost one of the most thorough-going investigators in the field of experimental psychology and psychophysics, in the technique of which he had few equals, and at the same time a penetrating student of epistemological and metaphysical problems."

Bernard Cronson, principal of the public school in Ninety-ninth Street, between Second and Third Avenues, New York City, died on February 1, aged fifty-one years. He introduced into his schools systems of pupil self-government, school newspapers and pupils' lunch systems, and carried out other social work among his pupils. He had been president of the Principals' Association and was the author of "Graded Lessons in Punctuation," "Graded Dictation and Spelling," "Methods in Elementary School Studies," "Pupils' Self-government," and "The Philosophy of Common Fractions and Square Root."—*School and Society.*

Professor J. Carleton Bell, of the Department of Education, University of Texas, recently delivered an address before the students of psychology and education at the University of Iowa on the subject "The Significance of Mental Tests for College Students."

During the first part of February Professor M. V. O'Shea of the University of Wisconsin accepted an invitation extended by the masters and trustees of St. Paul's School, Concord, New Hampshire, to make a study of the curriculum and methods of teaching improvement. He spent some time at the school, and held daily conferences with the faculty for the discussion of his findings.

Professor William Stern, professor of psychology at the University of Breslau, known for his work on differential psychology and on mental tests, has been called to Hamburg to take the position formerly held by the late Professor Ernst Meumann.

Professor Truman Lee Kelley, University of Texas, will give courses in educational psychology and mental tests at the summer session of the University of Washington.

Professor Raymond Dodge, of Wesleyan University, recently elected president of the American Psychological Association, has been appointed non-resident lecturer in psychology at Columbia University for the academic year.—*School and Society.*

Dr. David Snedden, commissioner of education for Massachusetts, has accepted a call to a professorship in educational administration at Teachers College, Columbia University. Professor Snedden will specialize in the administration and supervision of vocational education.

Dr. J. L. Henderson, professor of secondary education at the University of Texas, will give courses in high school curricula and the preparation of teachers for secondary schools at the summer session of Teachers College, Columbia University.

Francis N. Maxfield, Ph. D., assistant professor of psychology at the University of Pennsylvania, delivered two lectures on December 11, before the Teachers' Institute at Lancaster, Pa., on "Intelligence Tests Useful for Grade Teachers," and "The Public School Room and Juvenile Delinquency." He also conducted clinical work at the special school of the city.—*School and Society.*

A CORRECTION.

The attention of readers of the JOURNAL is called to a typographical error in the title of Professor Seashore's paper in the February issue. The title should have been "Elemental Tests," not "Elementary Tests."

CURRENT PERIODICALS

ZEITSCHRIFT FUER ANGEWANDTE PSYCHOLOGIE UND PSYCHOLOGISCHE SAMMELFORSCHUNG. Vol. VIII. 1914. PAUL ANDREAS WAGNER. *Das freie Zeichnen von Volksschulkindern.* 1–70. The article, which is richly illustrated with children's drawings, discusses first the number and kinds of details chosen by 1500 pupils from six to eighteen years of age to illustrate the story *Schlaraffenland.* There are seventeen of these details or motives, and the results are classified separately for boys and girls and for the different school grades. There is an extended discussion of the drawings expressing humor and motion, and of those protraying the human form. The author thinks that the introduction of modern methods of teaching drawing will decidedly enhance the quality of children's drawings in schools.

A. HOFFMAN. *Vergleichende Intelligenzprüfungen an Vorschülern und Volkschülern.* 102–120. From a total of 550 pupils in ten classes 156 were chosen for examination. These consisted of groups of thirty to thirty-five children from each of the two schools of the ages of seven and nine, and a group of twenty-nine children ten years old from the fourth class in the *Volkschule.* These 156 pupils were given the Binet tests for the sixth, seventh, eighth, and ninth years; and a detailed discussion of the showing made by each class of pupils in each of the tests and a comparison of the results for the two types of schools are given. Professor Stern discusses these results in a subsequent article, and points out that the striking superiority of the *Vorschule* pupils (from one half to a whole year of mental age) should not be used as an argument in favor of inferior school advantages for the pupils of the public schools, but holds rather that the best education available should be made accessible to all classes of children.

H. SCHIEFLER. *Zur Psychologie der Geschlechter: Spielinteressen des Schulalters.* 124–144. This study is based on the play interests of 1242 boys and 1166 girls from the ages of seven to fourteen. Tables and plates show the rise of certain types of play interests and the decline of others. These plays are taken up under the headings of imitative plays, plays involving bodily movement and contest, plays of mental activity and contest, and occupational plays, such as collections, playing on musical instruments, with animals, fishing, etc. The author rejoices to find that coeducation has no effect on children's plays.

SYDNEY ALRUTZ. *Zur Pyschologie der Taschenspielerkunst.* 181–192. The author calls this the first chapter in the history of the psychology of report. He examines very carefully the reports of the performances of noted prestidigitators that occupied the attention of scientific men in London about 1880 to 1887. The author's sources are particularly the reports to be found in the proceedings of the Royal Society.

STEFAN VON MADAY. *Die Fähigkeit des Rechnens beim Menschen und beim Tiere.* 204–227. The author gives an interesting sketch of the history of arithmetical computation by animals, sums up the observations that have been made on the beginnings of number in children, discusses the relation between arithmetical ability and intelligence, and raises the question whether horses can learn arithmetic. There is a bibliography of twenty-eight numbers.

L. M. KLINKENBERG. *Ableitung von Geschlechtsunterschieden aus Zensurenstatistiken.* 228–266. This study of sex differences on the basis of school marks is introduced by a description of the organization and course of study of the Dutch *Oberrealschule* and a comparison of this with the German schools. There is a discussion of the formulae used in the computation of sex differences, a consideration of the distribution of marks and a comparison between two groups of girls, one in a girls' school and one in a mixed school. The author finds girls not so well adapted as boys to the thought processes of mathematics, geography, and history. The girls in the lower classes show greater industry, and therefore somewhat higher grades. In the middle classes the differentiation begins to show itself in special subjects, the girls gradually drawing ahead in language work, the boys in scientific subjects.

E. D. WIERSMA. *Intelligenzprüfungen nach Binet und Simon und ein Versuch zur Auffindung neuer Tests.* 267–275. A report on the application of the Binet tests in Groningen. The new tests consisted of the application of Burt's dotting apparatus and concentration of attention test, the construction of new words from a given number of letters, an imagination test, a picture puzzle test, and a recognition test.

G. FR. MUTH. *Ornamentationsversuche mit Kindern. III. Ueber Alters-, Geschlechts- und Individualunterschiede in der Zierkunst des Kindes.* 507–548. A continuation of the development of ornamentation in children on the basis of personal observation of the drawings of two young children and of over two hundred school children from the sixth to the thirteenth year. The girls are distinguished by the great skill and delicacy of their work; and in the higher grades, are able to indicate the contrast between animate and the inanimate portions of a picture. The boys, on the other hand, show much rougher work, but are frequently more original. Often the value of the boys' work is determined by characteristics which lie quite outside the ornamental. The author traces an interesting parallel between phylogentic and ontogentic development in ornamentation.

Vol. IX. 1915. HANS RUPP. *Ueber die Prüfung musikalischer Fähigkeiten. Teil I.* 1–77. The first twenty-five pages of this study of musical capacities deal with methods of testing for absolute pitch. There follows a discussion of auditory discrimination, the recognition of successive and simultaneous intervals, melody, harmony, time, and rhythm. The last three chapters are illustrated by numerous examples particularly from the singing of children.

JOHANNES HABRICH. *Ueber die Entwicklung der Abstraktionsfähigkeit von Schülerinnen.* 189–244. An experimental study of the development of abstraction in seventy-two girls from various classes in the *Volksschule*. The essential point in the experiment was the correct recognition of similar groups of objects. The procedure of Koch is closely followed and the results obtained are compared with those previously secured from boys of the same group. The boys throughout show a higher degree of efficiency. The difference between the sexes increases with age. The author states that the easier tasks are better performed by the girls than the boys, but as the tasks become more difficult, the boys leave the girls far behind.

MAX LEVY-SUHL. *Der Zweck der Strafe in der Auffassung jugendlicher Angeklagter.* 245–267. In this article an effort is made to determine what adolescent delinquents think is the purpose of punishment. One hundred thirty-six persons are studied, ranging between the ages of twelve and eighteen years. The answers are grouped into two classes; first, it brings about a betterment of the evil-doer, so that he will not commit further misdeeds; and second, it is a general restraint and warning to others not to break the law. The answers are tabulated in detail along with the grade of intelligence and the delinquency of each individual.

EMMY SECKEL. *Ueber die Beziehung zwischen der Beliebtheit und der Schwierigkeit der Schulfächer.* 268–277. Over 250 pupils ranging from nine to twenty-one years of age were asked to indicate the hardest subject, the easiest subject, the subject liked best, and the subject liked least. The results are tabulated and discussed subject by subject. The German language is the favorite subject and is also found easy. Mathematics is generally considered difficult and is frequently disliked.

KAETHE UND ADOLF BUSEMANN. *Ueber die Entwicklung der Merkfähigkeit bei Schulkindern.* 277–279. In a study of memory span series of ten monosyllabic words were read aloud three times to the children, the first word of the series was then given them, and they were asked to reproduce the remainder. The children ranged from 8 to 14 years of age and included 245 boys and 242 girls. The span ranged from 3.4 words in the eighth year to 7.9 in the fourteenth year. The girls surpassed the boys at every age.

O. KOSOG. *Die Wertung der Testserien.* 280–298. A critical examination of the Binet tests on the basis of their application to the author's five year old boy. The boy tested somewhat over nine years in mental age, but from other evidence of the child's mental ability the author concludes that this only proves that the Binet tests for the lower ages are too easy. The author repeats Stern's warning against over-rating the diagnostic value of the tests.

HANNA NEUGEBAUER. *Aus der Sprachentwicklung meines Sohnes.* 298–306. A detailed account of the linguistic difficulties of a child in the second and third years, and of the expedients to which he resorted in expressing his ideas.

ALFRED MANN. *Zur Psychologie und Psychographie der Aufmerksamkeit.* 391–479. A detailed analysis of the factors that enter into attention, and an elaborate psychogram of the attention of a single individual. While the study has particular reference to adults, the fundamental idea of a complete map, so to speak, of a pupil's attention processes is important for education, and although the scheme developed in this article could not be used in its entirety with children, it might furnish a basis for an analysis that would be feasible for school diagnosis.

MARGARETE HOFFMANN UND BETTY REICH. *Vergleichend-psychologische Untersuchungen über Aufsätze von Schülern und Schülerinnen der Volksschule.* 480–512. Compositions were secured from the four upper classes of four different schools on the three subjects "Das Wiedersehen" (The Return), "Warum uns der Winter gefällt" (Why we like Winter), and "Was ich tun möchte, wenn ich gross sein werde" (What I should like to do when I grow up). About 2400 compositions were thus secured from 800 children. The present article gives a preliminary report of an analysis of certain phases of compositions on the second and third of these subjects. The results are so arranged as to bring sex differences into as high a light as possible. In the analysis emphasis is laid on the psychological characteristics revealed in the compositions rather than on their pedagogical or stylistic excellence.

ERNST BLOCH UND HEDWIG LIPPA. *Ueber Wiederholung der Binet-Simon'schen Intelligenzprüfungen an schwaschsinnigen Kindern nach einem Jahre.* 512–515. Of the 53 children re-examined by the 1908 Binet tests after the lapse of one year only 35 had any recollection of the previous tests, and these recalled nothing more than that pictures and money were shown. Six children showed an increase of two years in mental age, twenty-three of one year, ten of one-half year, and fourteen no increase at all.

PUBLICATIONS RECEIVED

LEONARD P. AYRES AND MAY AYRES. *School Buildings and Equipment.* Cleveland Education Survey, 1916. Pp. 117. 25c.

There are four factors that make for advancing standards in schoolhouse construction. These are changes in educational methods, consideration of the safety of school children, care for health, and the endeavor to increase the happiness of school life. This little book gives a brief sketch of the development of school house construction from 1850 to the present day, the fundamental conditions which determine the location and construction of the school plant, the cost per pupil per class-room and per cubic foot, and the problems confronting boards of education in modernizing old buildings and in providing new ones.

W. B. DRUMMOND. *The Child, His Nature and Nurture.* New York: E. P. Dutton and Company, 1915. Pp. viii, 223. $1.00.

This is an enlarged and revised edition of the author's little book which was originally published as one of the Temple Primers. The book contains chapters on the care of the infant, the growth of the child, the senses, the muscles, the emotions, the intellect, the will, habit, and Froebel and the kindergarten. Two new chapters have been added, the first dealing with "Children who Never Grow up," based especially on Goddard's recent studies of the feeble-minded, and "The Montessori Method." The style is simple and easy almost to the extreme. While the author claims to have brought the discussion up to date, there is little indication of any notice of the experimental studies that have been carried on in both England and America in the past five years.

MICHAEL F. GUYER. *Being Well-Born.* Childhood and Youth Series. Indianapolis: The Bobbs-Merrill Company, 1916. Pp. 374. $1.00.

The author's intention in this volume is to examine into the natural endowments of the child, and since full comprehension of it requires some understanding of the nature of the physical mechanism by which hereditary traits are handed on from generation to generation, a small amount of space is given to this phase. Then, that the reader may appreciate to their fullest extent the facts gathered concerning man, a review of the more significant principles of genetics as revealed through experiments in breeding plants and animals has been undertaken. The main applications of these principles to man is pointed out in a general discussion of human heredity. Finally, inasmuch as all available data indicate that the fate of our very civilization hangs on the issue, the work concludes with an account of the new science

of eugenics which is striving for the benefit of the race by determining and promulgating the laws of human inheritance so that mankind may intelligently go about conserving good and repressing bad human stocks. Among the most interesting chapters are those on "The Responsibility for Conduct," in which the dependence of our behavior upon the inherited structure of the nervous system is emphasized, and "Crime and Delinquency," in which the problems of the feeble-minded, the criminal, and the degenerate are considered from the biological point of view.

WILLYSTINE GOODSELL. *A History of the Family as a Social and Educational Institution.* New York: The Macmillan Company, 1915. Pp. xiv, 588. $2.00.

We have here a very scholarly and thorough treatment of the subject of the family as an educational influence. The introductory chapter emphasizes the recency of the historical study of the family and its importance from the genetic point of view. Subsequent chapters discuss the primitive family; the patriarchal family, as exemplified in the life of the Hebrews, the Greeks, and the Romans; the influence of early Christianity upon the status of woman, marriage, and family legislation; the family in the middle ages; the family during the renaissance; the English family in the 17th and 18th centuries; the family in the American colonies; the industrial revolution and its effect upon the family; the family during the 19th century; the present situation; and current theories of reform. In discussing the present situation, the author surveys the forces that make for the instability of the family, such as divorce, desertion, and the disintegrating influence of industrial conditions, and pays especial attention to the problems of the marriage rate and the birth rate. Especially deplorable is the condition of the family amongst the more intellectual classes, such as college graduates. "If the size of family of college graduates should continue to decrease as it did during the 19th century, students graduating in 1935 would have no children at all." The final chapter presents in some detail the various plans proposed to alleviate the situation. The radicals hope to bring about reform by opening all occupations to women and by making wages equal for women and men. Women are to be economically independent and thus join with men as equals in the founding of homes. The conservatives on the other hand adhere to the traditional conception of the home and of the sphere of woman and believe that the division of influence is in accord with biological evolution. The author seems to favor the views of the moderate progressives, which call for the revision of domestic codes and the passage of laws for the protection of women and children. In the final analysis a campaign of education is needed to quicken the minds of young men and women with reference to their social and biological duty in relation to each other and to the future of the race.

MARTIN HEGLAND. *The Danish People's High School, Including a General Account of the Educational System of Denmark.* Bulletin 1915, No. 45. Washington: Bureau of Education, 1915. Pp. 179. 20c.

The Danes believe thoroughly in training, and every inducement is held out to the youth to attain proficiency. Their ideal is first to lay a foundation with as good a general education as the parental means and the child's capacities allow. There is an opportunity to complete a course of general training at almost any year in the young person's life, but this general education has undergone striking changes within the last few years and the influence of modernism has been so strong as to cause an almost complete break with the Greek and Latin requirements of an earlier day. The preponderance of weight even in the gymnasia is now upon modern languages and upon subjects of more or less definite practical utility.

DAVID JAYNE HILL. *The People's Government.* New York: D. Appleton and Company, 1915. Pp. xv, 287. $1.25.

In every generation there is need of examining anew the foundations of government. At the present time this duty is more imperative than usual, for we have recently been passing through a period of criticism upon our institutions that has created in some quarters an unwarranted depreciation of their value; in others a genuine solicitude for their preservation. There are three concepts—the state, the law, and the citizen—that are fundamental to the realization of any high ideal of human society. Beginning with the state as an embodiment of force, we trace its development as a human ideal. We see it long dominated by law, regarded as a sovereign decree, until this conception has been superseded by the idea of law as mutual obligation. Finally we see the rights of the citizen as lawmaker and as subject to law and it is in the citizen that we find the solution of the problem of human government and of the co-ordination of human governments in the world organization of humanity. The book challenges the thought of every serious-minded reader, and offers much material for teachers of civics in the public schools.

WALTER S. HINCHMAN. *The American School.* New York: Doubleday, Page and Company, 1915. Pp. xii, 232. $1.00.

"The main purpose of this book is to interest the parent quite as much as the teacher in the problems which confront American secondary schools. Americans pay more for their education than any people in the world and though it may seem to the educator that they might reasonably pay yet more, it is not so much to the point to urge greater appropriations as to show what education may do, and to interest the citizen in the problems connected with it. He will not

be likely to appreciate the importance just because he pays high for it; but he will be ready to pay high for it if he appreciates its importance, and the great thing above and below all is that he shall appreciate its importance, for no system of education can relieve him of his office as chief teacher of his children." Among the problems discussed are the general significance of education, the pupil in relation to the school, the activities of the teacher and the difficulties of securing the right kind of teacher, the course of study, and the methods employed in teaching.

EDWIN B. HOLT. *The Freudian Wish and Its Place in Ethics.* New York: Henry Holt and Company, 1915. Pp. ix, 212. $1.25.

"Freud's contribution to science is notable and in my opinion epoch-making for a reason which has hardly ever been mentioned, and this reason is that.....he has given us a key to the explanation of mind. It is the first key that psychology has ever had which fitted and moreover I believe that it is the only one that psychology will ever need. This key to the mind, which Freud calls the wish, is the subject of the present volume." One of the most interesting chapters in the book is the physiology of wishes and their integration, in which the author skillfully pilots us through the devious ways of modern behaviorists and shows how the wish is the culmination of all forward projections of experience. The book is a stimulating and fruitful contribution to the Freudian literature.

HELEN B. HUBBERT. *The Effect of Age on Habit Formation in the Albino Rat.* Behavior Monographs. Vol. 2. No. 6. Serial No. 11. New York: Henry Holt and Company, 1915. Pp. 55.

In experiments with the circular maze the author finds that young rats learn more rapidly than old ones, and that the rapidity with which the habit may be formed decreases with increase in age. In very old and very young rats sex differences are negligible, while in those of medium age the males learn more rapidly than the females. Daylight and dark make no difference in the formation of the maze habit. He[illegible]ity seems to play a considerable part in the rate of learning, [illegible]e rapidity with which the maze habit may be formed is predic[illegible] within certain limits from one family group to another.

HENRY [illegible]OHNSON. *Teaching of History in Elementary and Secondary Schools.* New York: The Macmillan Company, 1915. Pp. xix, 497. $1.40.

With the increasing appreciation of the significance of history in both elementary and secondary education, there is a distinct need for a volume of this sort to examine the fundamental principles of the teaching of history. It is the author's aim to present as concretely as possible the fundamental conditions for making history of any

kind effective in the school room. An introductory chapter on what history is leads to the problem of grading history, which is essentially a problem in presentation. The author believes that history of any kind, even scientific history, can be taught almost at any stage of instruction on the simple condition that it is taught in a sensible way. There follow chapters on the aims and value of history, on the treatment of history in European schools, history in American school curricula, the biographical approach, the study of social groups, making the past real, the use of models, pictures and maps, textbooks and their use, collateral reading, school history and the historical method, the correlation of history with other subjects, and the history examination. There is a bibliography of 34 pages.

R. O. JOHNSON. *Measurement of Efficiency of Schools Established for the Deaf.* Report of Progress of the Committee on Research Appointed by the Conference of Superintendents and Principals of American Schools for the Deaf. Philadelphia: 1915. Pp. 18.

The report contains an account of educational tests for the deaf, and abstracts of addresses delivered by Henry H. Goddard on "Testing the Intelligence of Children and the Binet Simon Scale"; by A. Duncan Yocum on "Educational Development and Courses of Study"; by Bird T. Baldwin on "A Psycho-etiological Study of Meningitis and Educational Development"; and by G. Hudson MacKuen on "The Physiology and Psychology of Hearing with Special Reference to the Development of Speech."

R. O. JOHNSON. *Statistics concerning Deafness.* Extract from the Seventieth Annual Report of the Indiana State School for the Deaf, 1915. Pp. 28.

This pamphlet presents the statistics of cases received at the Indiana State School for the Deaf for the past seventy years. Among other data recorded are the ages at which deafness occurred, the causes of deafness, the degrees of deafness, the classification of deafness, the intermarriage of the deaf, and the relation between hearing and speech.

H. D. KITSON. *Psychological Tests for Lip-Reading Ability.* Volta Review, Vol. 17, No. 12. December 1915. Pp. 471–476.

"How long will it take me to become a good lip-reader?" This is the question that frequently confronts the teacher of the deaf. The author employed two tests, a test of perception, using Whipple's tachistoscope, and a completion test, and compared the ranking in these tests with ability in lip-reading. The sum of the ranks in the two tests compared with the rank in lip-reading gives a correlation coefficient of .80.

HERBERT G. LULL. *A Survey of the Port Townsend Public Schools.* Bulletin of the University of Washington: University Extension Series No. 17. Seattle: August 1915. Pp. 112.

The survey presents a general account of the administration of education in the district, a more careful study of the details of supervision, graphs representing school census enrollment, average attendance, number of teachers, high school graduates, and teachers' salaries for the past ten years or more. In the examination of the course of study and the quality of instruction, the Ayres' tests for spelling were given according to the Springfield, Ill., procedure; the handwriting was measured by the Thorndike scale; the work in arithmetic was determined by means of the Courtis standard tests and the Stone reasoning problems; Starch's reading tests were carried through the elementary grades, and the pupils' compositions were rated with the help of the Harvard-Newton scale. The results, presented in the forms of tables and graphs, constitute norms for further studies.

MELVIN ALBERT MARTIN. *The Transfer Effects of Practice in Cancellation Tests.* Archives of Psychology, No. 32, August 1915. Pp. 68. 60c.

In his introduction the author raises the question under what conditions, to what extent, and in what direction may we expect training of a special kind to produce transfer effects? While the experiment is limited to a narrow field (the effects of prolonged practice in cancelling in one situation upon cancelling in another situation), the materials and methods were such as to ensure exact quantitative scoring. Among the conclusions which the writer draws are the following: The extent and direction of the transfer effects depend upon the practice situation, upon the test situation, and upon the relation between them. When the two situations are much alike, the transfer effect is largest and in a positive direction. When the two situations are widely different there is interference, that is, the transfer effect is large and negative. When the test situation contains none of the content elements of the practice situation, but is such that the task performed is somewhat similar as to form with that of the practice, the transfer effects are negative, causing a decrease in accuracy.

CLARENCE ARTHUR PERRY. *Educational Extension.* Cleveland Education Survey, Cleveland, Ohio, 1916. Pp. 115. 25c.

School extension, or the wider use of the school plant, has taken a very firm hold upon American education. This little volume will be of distinct value to those engaged in this work, or to those who are desirous of taking it up, since it presents in convenient form not only what is being done in Cleveland but what some of the most progressive cities are doing to utilize their school plant.

Report of the Commissioner of Education for the Year ending June 30, 1915. Vol. 1, Washington: Bureau of Education, 1915. Pp. 780.

This volume contains a useful survey of educational legislation in 1915, accounts of education in larger and smaller cities and in rural communities, secondary education, higher education, the training of teachers, medical education, vocational education, kindergarten education, school surveys, education in Latin America, and in many of the leading European countries. The chapter on school surveys gives a condensed but representative account of the chief investigations undertaken during the last few years.

The Rockefeller Foundation. Annual Report, 1913–14. New York: Published by the Foundation, 1915. Pp. 226.

This report gives an account of the International Health Commission with its work in tropical countries, its investigation of industrial relations in New York City and other places, its work on mental hygiene, its efforts for the relief of suffering Belgium, its promotion of missions, and its medical work in China.

MIRIAM FINN SCOTT. *How to Know your Child.* Boston: Little, Brown and Company, 1915. Pp. x, 316. $1.25.

The aim of this book is to interpret children to their parents, to try to help parents to see the vast riches, hitherto but dimly seen or perhaps not perceived at all, which exist unutilized in their children, and to try to help parents recognize and develop this wasted human wealth. The book is written in an easy conversational style, and contains interesting chapters on the study of individual children, the nature of disobedience and the responsibility of parents for it, unspoiling the spoiled child, what to play and how to play it, children's clothes, and the relation between children and their father. While the book offers nothing that is new or scientific, the trenchant way in which many shortcomings of parents are attacked makes it worthy of high commendation.

Second Report on Fifty-two Border-line Cases in the Rome, New York, State Custodial Asylum. Albany, New York: State Board of Charities, 1915. Pp. 32.

There are charts showing the mental and physical ages of the fifty-two children, and a detailed account of each case, indicating the changes that have taken place since the first report was published.

RICHARD M. SMITH. *The Baby's First Two Years.* Boston: Houghton Mifflin Company, 1915. Pp. xi, 156. 75c.

The first ten chapters of the book give definite rules for the care and feeding of children up to two years of age. The second part consists of general suggestions which may be modified to suit the

individual baby. The third part presents recipes and charts. The chapters contain many helpful suggestions for the young mother, including complete directions for a typical day.

LOUIS STARR. *The Adolescent Period. Its Features and Management.* Philadelphia: P. Blakiston's Sons and Company, 1915. Pp. vii, 211. $1.00.

This book is written in a popular style with the aim of being useful to parents and others who have in their hands the welfare of adolescent boys and girls. There are chapters on growth and muscular development, physical education, diseases of adolescents, criminal tendencies, and sexual enlightenment. In the final chapter the author proclaims himself an advocate of sex enlightenment and paints a vivid picture of the perversions to which the policy of silence frequently gives rise.

WILLIAM A. STECHER. *The Theory and Practice of Educational Gymnastics.* Philadelphia: John Joseph McVey, 1915. Pp. v, 188. $1.50.

Part One of this book is devoted to general viewpoints regarding physical training in schools. The author distinguishes five age groups and indicates the kinds of games, plays, and gymnastics belonging to each. These age groups are first, infancy from birth to six years; second, childhood from six to twelve years; third, early adolescence from twelve to seventeen years; fourth, late adolescence from seventeen to twenty-one years; and fifth, maturity from twenty-one to full manhood. Part Two gives a detailed account of the essential physical training demanded by these age groups. Part Three gives a selection of useful exercises on apparatus and in games. Part Four describes dancing steps in the course of study. Part Five develops the principles underlying the selection and arrangement of movements. Parts Six describes special exercises. Part Seven illustrates gymnastic positions. Parts Eight, Nine and Ten give typical complete lessons for each school grade. The book as a whole constitutes one of the most complete manuals of educational gymnastics that has yet been published.

LEWIS M. TERMAN. *Research in Mental Deviation among Children.* Research Laboratory of the Buckel Foundation, Bulletin Number 2, Stanford University, November 1915. Pp. 15.

The author here gives an account of the origin of the Buckel Foundation, and the lines of research which are now being carried on under its auspices. These involve studies of backward and feeble-minded children, delinquent children, nervous or morbid children, children of superior ability, and normal children. The author also calls attention to certain additions which are urgently needed to supplement the work of the present foundation.